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NAIMA

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION

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VIA HAND DELIVERY

June 22, 1998

U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics (OPPT)
Docket Control Office (7407), Room G-009
401 M Street, SW
Washington, D.C. 20460

Re: DOCKET CONTROL NUMBER – OPPTS-42187A; FRL-4869-1

Dear Docket Control Officer:

Please find enclosed three copies of the North American Insulation Manufacturers Association's ("NAIMA") comments on the Environmental Protection Agency's Amended Proposed Test Rule for Hazardous Air Pollutants. In addition, I have enclosed a fourth copy of the comments. NAIMA respectfully requests that the Docket Office date stamp the fourth copy and return to NAIMA in the enclosed self-addressed, stamped envelope.

If you have any questions, please contact the undersigned at (703) 684-0084.

Sincerely,

Angus E. Crane

Angus E. Crane
General Counsel

Enclosures

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BEFORE THE ENVIRONMENTAL PROTECTION AGENCY

COMMENTS ON PROPOSED TEST RULE FOR HAZARDOUS AIR POLLUTANTS

HAP TASK FORCE
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The Dow Chemical Company
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June 22, 1998

COMMENTS OF THE NORTH AMERICAN
INSULATION MANUFACTURERS ASSOCIATION

INTRODUCTION

The North American Insulation Manufacturers Association ("NAIMA") presents the following comments in response to the Environmental Protection Agency's ("EPA") Amended Proposed Test Rule for Hazardous Air Pollutants, 62 Fed. Reg. 67,465 (December 24, 1997). NAIMA is a trade association of North American manufacturers of fiber glass wool, slag wool and rock wool insulation products. NAIMA's role is to promote energy efficiency and environmental preservation through the safe production and use of its insulation products.

These comments are filed on behalf of the following mineral wool member companies of NAIMA: American Rockwool, Inc.; Celotex Corporation; Fibrex, Inc.; Isolatek International; MFS, Inc.; OCHT, a Subsidiary of Owens Corning; Rock Wool Manufacturing; Sloss Industries; and USG Interiors Inc. These mineral wool companies, many of which are small businesses, would, unless exempted, be required to participate in the funding of EPA's Proposed Test Rule for HAPs with respect to carbonyl sulfide ("COS"). For the reasons set forth below, NAIMA's mineral wool members urge EPA to eliminate or delay the testing of COS from the test rule.

In addition, NAIMA has participated in the preparation of the Chemical Manufacturers Association's ("CMA") COS Test Panel's comments. NAIMA supports and incorporates by reference the comments submitted by CMA's Carbonyl Sulfide Panel.

I. EPA'S PROPOSED TESTING REQUIREMENTS FOR CARBONYL SULFIDE WILL HAVE A SIGNIFICANT FINANCIAL IMPACT ON THE MINERAL WOOL INDUSTRY AND REDUCE THE ENVIRONMENTAL BENEFITS PROVIDED BY MINERAL WOOL.

A. The Mineral Wool Industry

1. The Nature of Mineral Wool

The mineral wool form of synthetic vitreous fiber was initially developed in the mid-1800s by melting slag and spinning it into insulation for use in homes and industry. Over the past century, mineral wool manufacturing has evolved into a diversified industry as more and more products containing this useful material have been developed.

The term "mineral wool" actually encompasses two materials – rock wool and slag wool – that use different raw materials in their manufacture. Rock wool is made from natural rocks like basalt or diabase. Slag wool is made primarily from iron ore blast furnace slag.

Rock and slag wool fall within a group of materials historically referred to as man-made mineral fibers; however, a more accurate name is synthetic vitreous fibers ("SVF"), because this term reflects the glassy (non-crystalline) nature of these materials. Products made from rock and slag

wool are extremely useful. They are non-combustible and will not support the growth of mildew, mold or bacteria when tested in accordance with the specification of the American Society for Testing and Materials (ASTM C665). Rock and slag wool fibers are dimensionally stable and have high tensile strength. In addition to providing insulation, rock and slag wools absorb sound and, with a vapor retarder, help control condensation.

2. *Uses of Mineral Wool*

The physical and chemical properties of rock and slag wool are major factors in their utility. Because the fibers are non-combustible and have melting temperatures in excess of 2,000 degrees F, they are used to prevent the spread of fire. As a primary constituent of ceiling tile and sprayed fire proofing, rock and slag wools supply fire protection, as well as sound control and attenuation. The excellent thermal resistance of these wools is a major factor in their use as residential and commercial insulation, pipe and process insulation, insulation for ships, mobile homes, domestic cooking appliances and a wide variety of other applications.

3. *The Mineral Wool Manufacturing Process*

A centrifugal wheel process produces rock and slag wool insulation. Natural rock or iron ore blast furnace slag is melted, and the hot, viscous material is spun into fiber by pouring a stream of molten material onto one or several rapidly spinning wheels. As droplets of the molten material are thrown from the wheels, fibers are generated. As the material fiberizes, its surface generally is coated with a binder and/or de-dusting agent (e.g., mineral oil). The fiber is then collected and formed into batts or blankets for use as insulation, or baled for use in other products, such as acoustical ceiling tile and spray-applied fire proofing, insulating, and acoustical materials. During this manufacturing process, carbonyl sulfide ("COS") is emitted as a by-product. The COS emission originates from the coke used as the heat source that melts the slag or natural rock. COS is produced via the incomplete combustion of sulfur and carbon from coke in a reduced atmosphere. Thus, COS is not manufactured or used as an additive to the mineral wool manufacturing process, but is found only as an unwanted by-product.

4. *Financial Condition of Mineral Wool Industry*

The mineral wool producers in the United States are American Rockwool, Inc.; Celotex Corporation; Fibrex, Inc.; Isolatek International; MFS, Inc.; OCHT, a Subsidiary of Owens Corning; Rock Wool Manufacturing; Sloss Industries; and USG Interiors Inc. These producers operate fifteen facilities located in eight states. In recent years, several mineral wool companies have gone out of business, and several of the existing companies are currently in, or have recently emerged from, bankruptcy. The fluctuating state of bankruptcy of the different companies is indicative of the financially distressed condition of the industry.

In addition to companies being forced out of business due to adverse economic circumstances and several companies in various stages of bankruptcy, the existing producers have found it necessary to shutdown different facilities. For example, Fibrex permanently shutdown its facility in North Aurora, Illinois. Thermafiber, which purchased three former USG plants in Wabash, Indiana, Tacoma, Washington, and Birmingham, Alabama has been operating only two cupolas at each

facility. This is a significant reduction of previous activity. Thermafiber is no longer operating and American Rockwool has purchased its facilities. Thus, the mineral wool industry is currently comprised of nine companies.[1]

Six of the nine companies in the mineral wool industry are considered small businesses under the definition of the Small Business Administration (less than 750 employees). Due to the current economic condition, no new plants or manufacturing lines are planned during the next five years.

B. Environmental Benefits of Mineral Wool

1. Mineral Wool Products Reduce Greenhouse Gas Emissions

Rock and slag wool insulation products help promote energy efficiency and prevent pollution by reducing greenhouse gas emissions. By reducing the demand for energy, rock and slag wool insulation products help conserve nonrenewable fuel supplies and reduce the amount of pollutants that are released into the atmosphere through the burning of fossil fuels. Pollutants like carbon dioxide, released when fuel is burned to heat or cool a home, contribute to climate change.

The environmental implications of energy savings are directly linked to global climate change because less energy consumption means less emission of greenhouse gases. A 1996 report on the environmental and energy saving benefits of mineral wool insulation found that "a typical pound of insulation saves twelve times as much energy in its first year in place as the energy used to produce it." *Green and Competitive: The Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products*, Energy Conservation Management, Inc.; The Alliance to Save Energy; Barakat & Chamberlin, Inc., June 1996 (Exhibit 1). The report goes on to say that current fiber glass and mineral wool insulation levels save consumers nearly $84 billion a year in heating and cooling costs. In addition, the report says that "installed insulation in U.S. buildings prevents the emission of over 1.56 trillion pounds of carbon dioxide annually . . . that means that total U.S. carbon dioxide emissions would be almost fifteen percent higher without insulation." If all industrial plants installed insulation where economically feasible, approximately 61 trillion BTUs could be saved annually.

The tremendous energy savings offered by mineral wool insulation products is an environmental benefit recognized by the EPA. Indeed, EPA's Energy Star Programs and Products acknowledges that "electricity generation accounts for 35 percent of all U.S. emissions of carbon dioxide, 75 percent of sulfur dioxide, and 38 percent of nitrogen oxides." The EPA concludes that "[e]nergy-efficiency is a positive step toward reducing air pollution."

NAIMA and its member companies have teamed with the EPA in developing and promoting a program known as Energy Star Homes, that assists new home builders in developing energy-efficient homes through effective use of insulation products. In recognition of NAIMA's efforts, the EPA named NAIMA a 1997 Energy Star Homes Ally of the Year as Outstanding Industry Association.

[1] NAIMA represents all mineral wool manufacturers operating in the United States.

In that EPA actually promotes the use of insulation as a means to reduce pollution, it seems counter-productive to impose a test rule upon the mineral wool industry that could cost a million dollars or more -- a cost that in combination with other regulatory burdens could force some of these companies out of business. What will EPA have achieved? COS, a substance that occurs naturally in the environment, will have been tested, but at the price of the survival of companies that produce a product that actually reduces pollution. EPA should not work at cross-purposes with itself. Weighed in the balance the reduction of air pollutants from the use of insulation is far more significant and environmentally beneficial than the testing of a naturally occurring substance that has never been found or suspected of creating any public health risk or environmental problems. Therefore, the Agency should protect the environmental benefits offered by mineral wool companies by eliminating from the final rule any testing requirement applicable to COS.

2. *Slag Wool Products Contain High Recycled Content*

Not only do mineral wool products save energy, but these same products use a high percentage of recycled material, which further helps the environment. The use of recycled material marks a shift from reliance on extracting natural resources to using materials derived from secondary sources. In addition to reducing the demand on virgin resources, using recycled materials saves landfill space by diverting materials from the solid waste stream, and reduces the energy used and pollution emitted during the manufacturing process. Slag wool products not only divert blast furnace slag from being sent to a landfill, but a significant portion of slag used to make mineral wool is actually removed from waste disposal sites.

Production of iron in a blast furnace yields a slag that contains oxides of silicon, aluminum, calcium, and magnesium, along with trace elements. The vast majority of this blast furnace slag is "air-cooled," which is the type of slag used to produce slag wool insulation. According to U.S. Department of Interior statistics, a total of 21.4 billion pounds of air-cooled blast furnace slag was produced in the United States in 1994. See U.S. Department of Interior, Bureau of Mines, *Slag-Iron and Steel* (Annual Review – 1994), at 12 Table 4 ("DOI Annual Review").

NAIMA routinely records the amount of recycled materials used in the manufacture of fiber glass and slag wool insulation and commissions an annual survey to report their use by manufacturers. Results of the most recent survey (1996) shows that NAIMA members who produce slag wool insulation used more than 1,123,428,000 pounds of blast furnace slag that otherwise would have been disposed of as waste; this saved approximately 16 million cubic feet of landfill space. The Depart of the Interior has published similar statistics on the recycling of blast furnace slag by mineral wool companies. Thus, the mineral wool industry consumes a significant portion – approximately six percent – of the blast slag produced in the United States that might otherwise end up in the landfill. The industry estimates that over 90 percent of their slag acquisition is new slag purchased directly from manufacturers. The remaining ten percent is mined from waste disposal sites. Even the slag removed from existing disposal sites provides a tremendous benefit to the environment by removing waste from existing disposal sites and recycling it into a product that helps conserve energy.

Hence, a related environmental feature of slag wool products is their high recycled content. Slag formed during the reduction of iron ore to pig iron is the primary raw material used in the United

States to make slag wool today. Waste slag accounts for 70 to 90 percent of the weight of the raw materials that make up the slag wool. Such a high recycled content distinguishes slag wool as the insulation product with the greatest amount of recycled material.

Similar to the EPA's promotion of energy efficiency to combat emissions of pollutants from the burning of fossil fuels, the Agency also advocates the acquisition of environmentally preferable products. *See* 60 Fed. Reg. 50,721 (September 29, 1995). A feature of environmentally preferable product is high recycled content. If mineral wool companies are forced out of business by a costly HAPs test rule, the blast furnace slag previously diverted from landfills will end up in a landfill. Again, EPA should avoid working at cross purposes by recognizing the environmental benefits of rock and slag wool products and protect this industry from unduly burdensome regulatory requirements.

II. THE UNIQUE CHARACTERISTICS OF CARBONYL SULFIDE MAKE TESTING UNDER TSCA § 4 INAPPROPRIATE.

A. COS Occurs Naturally in the Environment

As stated in EPA's "Section 4 Test Rule Support for 21 Hazardous Air Pollutants," April 4, 1995 ("Support Document"), carbonyl sulfide is the most abundant sulfur-bearing compound in the atmosphere. The majority of the carbonyl sulfide in the atmosphere originates from naturally occurring sources. According to EPA, COS derives from microbes, oceans, marshes, soil, the burning of vegetation, and volcanoes.[2] Atmospheric transformation of carbonyl disulfide to carbonyl sulfide accounts for approximately 35 percent of carbonyl sulfide emissions. Of the remaining portion of COS emissions, approximately 43 percent is emitted from the natural sources noted above. Thus, natural or nonanthropogenic sources constitute approximately 78 percent of the COS emissions in the United States. Indeed, the EPA acknowledges that the "fraction of COS emitted to the environment by commercial sources is insignificant compared with that emitted by non-commercial sources."[3]

In addition to recognizing that less than 25 percent of COS emissions emanate from man-made or commercial sources, EPA also acknowledges that carbonyl sulfide lacks any full-scale production in the United States. Since COS is not manufactured in large quantities by commercial interests, offers no financial benefit in the market place, and originates in great quantities from nature, testing of carbonyl sulfide under TSCA section 4 is not appropriate. To illustrate, consider that the EPA estimates that emissions from carbonyl sulfide from natural sources total 5.8 to 7.68 million tons per year contrasted with TRI reported COS emissions of 16.7 million pounds (8,350 tons). Thus, TRI reported emissions account for only about 4 percent of the total COS emissions. The remaining portion of man-made sources, utilities and biomass burning, are not reported through TRI. Furthermore, many industrial processes may unknowingly emit COS, and therefore, those emissions would not be reflected in TRI submissions.

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[2] Section 4 Test Rule Support for 21 Hazardous Air Pollutants, April 4, 1995 at 2 and 4.

[3] Peyton, T.O., et al. (1976). *Carbon Disulfide, Carbonyl Sulfide: Literature Review and Environmental Assessment* (EPA, Office of Health and Ecological Effects), at 13.

Based on the fact that the vast majority of COS emanates from natural sources and the additional fact that COS is not manufactured for a specific purpose but is generated as an unintentional constituent, EPA should withdraw its proposed test rule for carbonyl sulfide. Such a decision would preserve the environmental benefits offered by the rock and slag wool products by protecting that industry from a financially burdensome test rule. Moreover, EPA could reserve Agency and industry resources for more practical issues, for no matter what the risks from COS the EPA's test rule identifies, the major sources of COS – nature itself – cannot be controlled.

B. Exposure to COS Is Insignificant

The EPA mandates testing where "human or environmental exposure is of such magnitude or type that it may need to be regulated if test data reveal adverse effects."[4] In selecting COS for testing, the EPA seems to have removed itself from a real world context. There is no need to determine the residual risk of COS because of the insignificant exposure from facility emissions. Even if EPA were able to demonstrate that the environment and human population were exposed to facility emissions of COS at hazardous levels, EPA is left with the fact that the majority of potential exposure comes from natural sources. Hence, EPA cannot regulate the emission of the vast majority of COS emissions.

C. NTP Has Nominated COS For Testing

The National Toxicology Program was established by the Secretary of the then Department of Health, Education and Welfare in 1978 "to strengthen the Department's testing of chemicals of public concern, as well as in the development and validation of new and better integrated test methods."[5] The NTP's primary mission is to select chemicals for carcinogenicity and other types of testing and then to coordinate, oversee and report the results of such testing.

The NTP includes a director, an Executive Committee and a Board of Scientific Counselors. The Executive Committee is composed of eight agency heads or their delegates. In fact, the Environmental Protection Agency is one of the eight entities represented on the Executive Committee.

The Board of Scientific Counselors is composed of non governmental scientists, appointed by the Assistant Secretary for Health for staggered four-year terms, who "are recognized authorities knowledgeable in fields such as toxicology, pharmacology, pathology, biochemistry, Epidemiology, mutagenesis, carcinogenesis, reproductive and developmental toxicology, and biostatistics."[6] The Board of Scientific Counselors has been described as the "primary oversight body for the NTP."[7]

On August 1, 1996, the NTP's Executive Committee reviewed and approved an ICCEC recommendation on 11 chemicals nominated to the NTP for extensive toxicological characterization and evaluated by the ICCEC on July 15, 1996. Six of the chemicals, carbonyl

[4] 57 Fed. Reg. 2138, 2144 (January 17, 1992).
[5] 43 Fed. Reg. 53,060 (November 15, 1978).
[6] 57 Fed. Reg. 31,721 (July 17, 1992).
[7] *Id.*

sulfide among them, were recommended by the ICCEC for study. The other chemicals were either deferred or recommended for no testing.

It is interesting to note that COS was nominated for NTP testing by the Environmental Protection Agency. As background explanation for the different nominations, the NTP stated that "[c]hronic toxicity data for . . . carbonyl sulfide are needed by regulatory agencies in order to set emission standards in compliance with the Clean Air Act amendment." Further information on NTP's planned testing of COS is provided in the excerpts from the NTP's most recent annual reports, attached as Exhibit 2.

The NTP further indicates that it plans to conduct inhalation studies for carbonyl sulfide. The thrust of the study will be to define certain key aspects of the toxicity of carbonyl sulfide such that the larger carbon disulfide database can be used to complete the data set needed for risk assessment. The NTP will also have the advantage of a toxicokinetic study and a neurotoxicity study of COS produced through the collaborative efforts of the EPA, NIEHS and Duke University Medical Center. In addition, NTP will have access to the preliminary mechanistic studies on COS from Duke University Medical Center.

The EPA actively participates on the NTP's Executive Committee. The Agency has successfully had COS nominated for testing by NTP. Plainly the Agency trusts the expertise, scientific judgment and integrity of the NTP. Given that NTP has already committed itself to study the potential health effects of COS, EPA should avoid taxing agency and industry resources to conduct a duplicative study. Even if the EPA were to deem the TSCA section 4 testing necessary, a more prudent approach would be to delay TSCA section 4 testing until the results of the NTP tests are known. Not only will NTP test results help determine the need to conduct further testing, but it will also provide a wider data base from which to select appropriate parameters for subsequent testing of COS.

As an agency of the federal government exercising legal authority over the corporate citizens of this country, EPA owes a fiduciary duty to wield its power in a judicious fashion. To impose a costly test program upon tax paying entities while another federal agency is simultaneously using tax dollars to test the very same substance shows a want of sound management principles. Duplicative efforts benefit no one. Since tax dollars are being used to conduct testing of COS through the NTP, those parties potentially responsible for funding the TSCA section 4 test rule on COS deserve the knowledge obtained through the NTP study before sinking large sums of money into a test program that may prove unwarranted. Thus, the EPA should withdraw its proposed test rule on COS and await the results from the NTP study.

D. Carbonyl Sulfide Should Not Be Subject To A TSCA § 4 Test Rule Because It Is Not A Commercially Produced Substance.

Carbonyl sulfide is the first substance for which EPA has proposed a TSCA § 4 test rule that is not produced commercially but rather is produced exclusively as the unintended byproduct of various production processes. In the mineral wool manufacturing process, for example, the combustion of coke to heat the rock and slag mixture used to make mineral wool generates carbonyl sulfide that is emitted as part of a mixture of gases from the cupola smokestack. The carbonyl sulfide from this

process is never isolated and has no commercial value. EPA's unprecedented expansion of its TSCA § 4 testing authority to substances produced only as emissions from manufacturing processes is contrary to the intended purpose and scope of TSCA and could have disruptive repercussions for the administration of the statute. *See* subpart 1, below. Moreover, EPA's proposed new approach regarding "Persons Required to Test," intended at least in part to address some of the potential problems and inconsistencies created by the proposed testing requirements for carbonyl sulfide, needs to be clarified and revised to make it more reasonable and fair. *See* subpart 2, below.

1. TSCA § 4 Testing Requirements Apply Only To Entities That Manufacture or Process Substances for Commercial Distribution.

Congress intended testing requirements imposed under TSCA §4 to apply only to "manufacturers" and "processors" of chemical substances and mixtures.[8] While TSCA as a whole does address more broadly the "manufacture, processing, distribution in commerce, use, or disposal [that] may present an unreasonable risk of injury to health or the environment,"[9] the TSCA § 4 testing responsibilities were specifically limited to manufacturers and processors of a substance or mixture, excluding those that distribute, use or dispose a chemical substance or mixture. The reason for this limitation is that because manufacturers and producers have the greatest financial interest in the substance, they should be required to undertake the cost of testing.

Companies that generate and emit carbonyl sulfide from industrial processes, such as mineral wool manufacturing, can therefore only be required to test carbonyl sulfide under TSCA § 4 if they "manufacture" or "process" carbonyl sulfide as those terms are defined under TSCA. The statute and its legislative history indicate that Congress intended the terms "manufacture" and "process" to include only those actions involved in the production of a chemical substance or mixture that is distributed into the stream of commerce, and not the incidental generation of a substance as part of a non-recovered emissions stream. This construction is most clearly compelled by the statutory definition of "process," which is expressly defined as "the preparation of a chemical substance or mixture, after its manufacture, for distribution in commerce." TSCA § 3(10), 15 U.S.C. § 2602(10). This definition not only directly limits the term "process" to substances distributed in commerce, but also indirectly does the same for the term "manufacture," by suggesting that a chemical substance or mixture is "distribut[ed] in commerce after its manufacture."[10]

Limiting testing responsibilities to those that "manufacture" or "process" the substance for distribution in commerce is consistent with congressional goal of requiring those companies with the greatest financial interest in a substance to pay for its testing. There are numerous other indications that Congress intended the term "manufacture" to mean the production of a chemical distributed in commerce. For example, in the section of the statute concerning cost-sharing for section 4 testing costs, the statute states that the determination of fair and equitable reimbursement

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[8] TSCA § 4(b)(3)(B), 15 U.S.C. § 2603(b)(3)(B); *see also* TSCA § 2(b)(1), 15 U.S.C. § 2601(2)(b)(1) ("the development of such [health] data should be the responsibility of those who manufacture and those who process such chemical substances and mixtures.").

[9] TSCA § 2(a)(2), 15 U.S.C. § 2601(a)(2).

[10] The statutory definition of "manufacture" includes to "import," which again generally applies only to chemicals distributed in commerce, as well as to "produce" or "manufacture," which do not provide further clarification on the meaning of "manufacture." TSCA § 3(7), 15 U.S.C. § 2602(7).

should consider "the share of the market for such substance or mixture of the person required to provide reimbursement in relation to the share of such market of the persons to be reimbursed." TSCA § 4(c)(3)(A), 15 U.S.C. § 2603(c)(3)(A). Obviously, a substance such as carbonyl sulfide that is generated only as emissions into the air has no market share, and thus was not intended to be included within the definition of "manufacture."

The legislative history of TSCA likewise indicated that the term "manufacture" means to "import, produce, or manufacture *for commercial purposes*." S. Rep. No. 698, 94th Cong., 2d Sess. 19 (1976) (emphasis added). Congress expressly recognized that some substances may be produced as byproducts, but that the producers of such byproducts should not be subject to section 4 testing requirements:

> Such chemical substances arising during the formulation, storage, or use of such mixture should be considered as byproducts of the precursor substance or substances. The responsibility for reporting and testing such byproducts under the provisions of this legislation would then fall upon the manufacturer of the precursor substance.

Id. The House Committee expressed a similar intent:

> Substances which occur incidentally to the storage or end use of such combinations should be considered as byproducts, and the responsibility for meeting the testing, notification, and other requirements with which manufacturers must comply would fall upon the manufacturer of the substance or mixture from which the product is produced.

H.R. Rep. No. 1341, 94th Cong., 2d Sess. 13 (1976). The emissions of carbonyl sulfide from mineral wool manufacturing results from the burning of coke used to heat the reaction vessel. Pursuant to the clear direction in the legislative history, this "end use" of coke by mineral wool manufacturers that generates carbonyl sulfide as a byproduct should not result in the imposition of testing requirements on mineral wool manufacturers

This interpretation is further compelled by other sections of TSCA that also use the term "manufacture." For example, TSCA § 5 requires pre-manufacturing notice for any new chemicals that are "manufactured" or "processed." 15 U.S.C. § 2604(a). EPA has not interpreted this provision, nor should it or could it, to require notification for any constituent included in an emissions stream that is not otherwise commercially produced. Rather, for purposes of section 5, EPA properly interprets "manufacture" to include only the production of chemical substances "for distribution in commerce as a chemical substances *per se*," expressly excluding byproducts which have "no commercial purpose." 40 C.F.R. § 710.4(d).

Yet, if the generation of carbonyl sulfide emissions during a production process is deemed to be the "manufacture" of carbonyl sulfide under TSCA § 4, then under well-established canons of statutory construction, the identical term "manufacture" in other sections of the statute must likewise be construed to cover such generation of emissions constituents. *See, e.g., Commissioner of Internal Revenue v. Keystone Consolidated Industries, Inc.,* 113 S.Ct. 2006, 2011 (1993) ("It is a 'normal

rule of statutory construction,' *Sorenson v. Secretary of Treasury*, 475 U.S. 851, 860 (1986), that 'identical words used in different parts of the same act are intended to have the same meaning.' *Atlantic Cleaners & Dryers, Inc. v. United States*, 286 U.S. 427, 433 (1932))." Such an enlargement of the term "manufacture" throughout the statute would have absurd consequences that would disrupt many years of established EPA practice in implementing TSCA, and, like the proposed expansion of § 4 testing requirements to a substance that is not commercially produced, would be contrary to the intended scope and purpose of TSCA.[11]

2. *EPA's Proposed Revisions to Its "Persons Required to Test" Criteria Need to Be Clarified and Revised To Make Them More Fair and Reasonable.*

In its re-proposal published on December 24, 1997, EPA made several revisions to its criteria for "Persons Required to Test" included in the original proposal. One important change that NAIMA fully supports is that the carbonyl sulfide testing requirements were expanded from just those companies that report carbonyl sulfide on the Toxic Release Inventory to all entities that emit carbonyl sulfide. There is no practical or legal basis for including some types of companies that emit carbonyl sulfide but not others based solely on SIC classification or TRI reporting requirements, and there is certainly no rationale for such a discriminatory application under the TSCA statute. While NAIMA asserts that no company should be subject to TSCA § 4 testing requirements based solely on emissions of a chemical, if some such companies are subjected to testing responsibilities based solely on emissions, then such requirements should apply to all industry sectors that emit the same chemical.

EPA also proposes to eliminate the artificial and unsupportable distinction it has made in the past between "byproducts" and "impurities," subjecting the former to testing requirements but not the latter. Because impurities are included in marketable products, whereas byproducts may not, impurities should be subject to TSCA § 4 testing requirements before byproducts because, as discussed in the previous subsection, Congress intended § 4 testing requirements to apply to manufacturers or processors of a chemical that is distributed in commerce. An impurity is distributed in commerce, whereas a byproduct may never enter the stream of commerce, as is the case for carbonyl sulfide. EPA's prior approach that subjected "byproduct" manufacturers to testing requirements but not "impurity" manufacturers was therefore backwards.

EPA's re-proposal also proposes to initially exempt from testing requirements those facilities producing less than 25,000 pounds of carbonyl sulfide. In addition, EPA would exclude from consideration any chemical present as a component of a chemical substance or mixture at a concentration of less than one percent. 62 Fed. Reg. 67,466, 67,470 (Dec. 24, 1997). NAIMA supports the one percent exclusion, but is concerned that it may be interpreted and applied in an arbitrary and inequitable manner. EPA has not explained how the one percent exemption would apply to carbonyl sulfide, or to an emissions stream generally. Based on the language of EPA's re-proposal, which is somewhat ambiguous, NAIMA is concerned that EPA might construe its one

[11] Although EPA's regulations contain the qualifier that byproducts are "manufactured" for "a commercial purpose" with respect to other provisions of TSCA, these agency regulations cannot overcome the strong presumption that the same term "manufacture" should be interpreted consistently throughout the statute, and indeed there is no indicia of Congressional intent that "manufacture" should be construed inconsistently in different sections of TSCA.

percent exemption to not include a chemical such a carbonyl sulfide that is present in an emissions stream at a concentration of less than one percent on the grounds that such an emissions stream does not meet the narrow definition of a "substance" or "mixture." Any such interpretation would be unreasonable and grossly unfair for the reasons elaborated below.

First, it would make no sense that a chemical produced and present in a marketable product at a concentration of less than one percent would not be subject to testing requirements but the same or a different chemical present in an emissions stream also at a concentration of less than one percent would be subject to testing requirements. Such an approach would apply more stringent testing requirements to a given quantity of a chemical if it is produced and then emitted rather than being included in a product stream. Not only is there no rational basis for such discrimination, but also the statutory testing requirements were directed primarily, if not exclusively, at chemicals contained in distributed products rather than chemicals emitted without commercial production, as discussed in the previous subsection. At a minimum, therefore, the same one percent exclusion should apply to emission streams in the same manner as to product streams.

Second, NAIMA is concerned that EPA may narrowly define the terms "substance" and "mixture" to exclude emission streams, and thus preventing companies that only emit a chemical from benefiting from the one percent exclusion as worded in the Agency's re-proposal. For example, EPA's re-proposal suggests that "substances" are those chemicals listed on the TSCA chemical substance inventory and have Chemical Abstracts Service ("CAS") numbers. 62 Fed. Reg. at 67,470. Such a definition would create a "Catch 22" for emission streams, because the TSCA chemical inventory and CAS numbers are primarily "substances" in U.S. commerce, as EPA's own notice acknowledges. *Id.* Emission streams are not "in U.S. commerce," and therefore are generally not listed on the TSCA inventory or assigned CAS numbers. In other words, emissions streams have traditionally not been treated as "manufactured" "substances" under TSCA. EPA now proposes to take an action completely inconsistent with this traditional paradigm by treating carbonyl sulfide that is present exclusively in emissions streams as a "manufactured" "substance." EPA cannot have it both ways. It would be internally contradictory if EPA were to now deny the "manufacturers" of that carbonyl sulfide the benefits of the one percent exclusion simply because the Agency has traditionally not treated emissions as "manufactured" "substances." EPA must recognize the radical departure from past practice and problematic consequences created by its carbonyl sulfide testing proposal, and cannot simply apply its traditional definitions without causing major inequities and unreasonable results. EPA should therefore not limit the one percent exclusion to the traditional definitions of "substance" and "mixture," but rather should apply the exclusion equally to all product, process, waste and emission streams.

Notwithstanding that most emissions streams have not been treated as manufactured "substances" under TSCA, NAIMA understands that a small number of emission streams have been listed on the TSCA inventory and assigned a CAS number. For example, carbon black emissions are apparently listed on the TSCA inventory as a Class 2 substance and have been assigned CAS number (68608-56-0). Carbon black emissions include carbonyl sulfide, and as a "substance," such emissions should be exempt under EPA's approach if carbonyl sulfide is present at a concentration of less than one percent. If carbon black emissions are eligible for the one percent exemption, then so too should the emissions from any other industrial process containing carbonyl sulfide, including those not listed on the TSCA inventory or assigned a CAS number.

For the very reasons spelled out above, most emissions have (appropriately) not been treated as manufactured "substances" under TSCA, and thus not listed on the TSCA inventory. At least with respect to carbonyl sulfide emissions, there is no qualitative difference between carbon black emissions and other carbonyl sulfide-containing emissions such as those from mineral wool manufacturing. The mere fact that carbon black emissions presented some previous, unrelated issue or problem that resulted in it being listing on the TSCA inventory is not a rational basis to apply the one percent exception to that industry but not to other industries that likewise emit carbonyl sulfide through similar processes. To do so would violate the established rule that an agency may not arbitrarily discriminate against different regulated entities. *See Hall v. McLaughlin*, 864 F.2d 868, 872 (D.C. Cir. 1989) ("[r]easoned decisionmaking requires treating like cases alike"); *United States v. Diapulse Corp. of America*, 748 F.2d 56, 62 (2d Cir. 1984) ("Deference to administrative discretion or expertise is not a license to a regulatory agency to treat like cases differently."). The carbon black example demonstrates that the one percent exemption can and should be applied to emission sources, which necessarily means that all similar carbonyl sulfide emissions should be eligible to benefit from the one percent exemption.

Finally, EPA s re-proposal contemplates that if all "manufacturers" of a substance are initially exempt from testing under the one percent exemption, then all such companies would be secondarily responsible for testing and would be directed by EPA to conduct the testing. NAIMA respectfully suggests that if no company meets the initial criteria for being required to test, EPA should consider alternatives to TSCA § 4 for obtaining the desired testing data. EPA's approach is equivalent to a judge declaring that all defendants should be treated as guilty because they have all been found innocent. EPA should instead, as discussed above, nominate such a substance for testing by the NTP, whose criteria for testing include substances that are not closely associated with a single commercial organization and chemicals which generate too little revenue to support further evaluations, both of which apply to carbonyl sulfide.[12] Indeed, as discussed above, the NTP has already decided to proceed with testing of carbonyl sulfide at EPA's recommendation, which is a more suitable approach for testing carbonyl sulfide than TSCA § 4, given the many unique characteristics of carbonyl sulfide discussed above.

III. EPA'S PROPOSED TESTING REQUIREMENTS FOR CARBONYL SULFIDE VIOLATE THE PROCEDURAL AND SUBSTANTIVE REQUIREMENTS OF SBREFA.

EPA has refused to comply with the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA") in the HAPs test rule, based in large part on its improper and unlawful redefinition of the terms "small entities" and "significant impact" as used in SBREFA. *See* subpart A, below. In fact, the proposed test rule for carbonyl sulfide will have a significant economic impact on a substantial number of small mineral wool manufacturers, thus triggering the requirement to comply with SBREFA. *See* subpart B, below. EPA has failed to comply with both the procedural and substantive requirements of SBREFA with respect to the carbonyl sulfide proposal, rendering it legally defective if EPA proceeds with the test requirements as proposed. *See* subpart C, below.

[12] TSCA § 2(a)(2), 15 U.S.C. § 2601(a)(2).

A. EPA Has Improperly and Unlawfully Redefined SBREFA Standards for Determining Small Business Impacts.

1. Redefinition of Small Sources

The EPA is seeking comment on the use of the Agency's definition of "small business."[13] The EPA's redefinition of small business is important because the Agency concludes that the HAPs Test Rule will not have a significant impact on small businesses. In order to reach this conclusion, however, the Agency has had to redefine "small business" in a manner that not only dramatically departs from the Small Business Administration's definition of small business but also creates a criteria that may be uniquely suitable for chemical manufacturers but certainly not relevant to other types of manufacturers who may be subject to the test rule.

For example, the EPA considers production volume of less than or equal to 100,000 pounds per year indicative of a small business. While such parameters may be useful in identifying small chemical manufacturers, such parameters do not contemplate those businesses that produce products that by their very nature weigh significantly more than a chemical substance. For instance, mineral wool producers manufacture batt and blanket insulation products. Weekly production alone may exceed 100,000 pounds even from a small company. Therefore, using production volume to define "small business" is extremely myopic and does not contemplate the vast span of EPA authority over non-chemical producing entities. It is this narrow perspective of governmental agencies that led Congress to enact the Regulatory Flexibility Act in the first place. Congress recognized that agencies have a tendency to treat all entities equally, when in reality there are distinct and important differences that make neat and tidy categories impossible. Instead of trying to put a round peg into a square hole, EPA must display some of the flexibility called for by the RFA and depart from the narrow confines of its proposed revised definition of small business.

Specifically, EPA must recognize that many manufactured products' weight will enable a company to produce 100,000 pounds of a product within a day or week. The total weight of production volume has little to do with the size of the business or its capacity to shoulder the financial burden of EPA imposed testing and more to do with the nature and characteristics of a given product. Hence, EPA should eliminate the use of production volume as a criterion for identifying small businesses.

Similarly, the annual sales of a company may be no more telling of the size or ability to safely bear the costs of mandated testing than production volume. To arbitrarily establish an annual sales figure that will determine an entity's status as a small business without reference to or consideration of the type of product sold or the ticket value of specific product is harmfully inflexible. For example, many companies may produce an incredibly large volume of a small gadget that will make the annual sales extremely high. The facts, however, reveal that this particular company must sell a large number of these gadgets in order to make a profit. Therefore, in this instance, the high annual sales has little to do with the solvency or profitability of the company and more to do with the price of the product and number of sales needed to show a profit.

[13] 62 Fed. Reg. 67, 465, 67,479 (December 24, 1997).

The reverse may also be true with a small company producing relatively limited numbers of products but selling the item for a large sum. The annual sales will appear to be high because the ticket price makes that particular item expensive. Yet the annual sales for the company making the expensive item does not reveal whether that entity is profitable. That company may be barely making its mortgage payment, even though its annual sales are high. Why? Because most of the earnings goes into remaking the product. Such companies must exist for an extended time period before they become financially solvent and profitable.

EPA's redefinition of small business takes none of these factors into consideration, but simply declares that if a company has annual sales of X dollars, it must be a profitable company that is large enough to bear the financial burden of a costly test rule. Because the straight use of annual sales does not allow for consideration or evaluation of the financial solvency or viability of a company, the EPA should abandon the use of annual sales as a factor in determining a small business.

As an alternative, EPA should return to the definition offered by the Small Business Administration, which looks to the number of employees to define a small business mineral wool manufacturer. Congress recognized the expertise of the Small Business Administration in "small business concerns" and delegated authority to the SBA to develop small business size standards. Just as EPA is given deference for its expertise on scientific matters and environmental issues, the SBA is given deference by Congress and the courts on business matters. If the Agency demands recognition of its own congressionally recognized expertise, it should follow its own counsel and lend credence to the expertise Congress has recognized in the SBA.

The SBA demonstrates its expertise by the manner in which it defines small businesses. The SBA qualifies its use of annual sales[14] or production volume because it knows that such figures are wrought with ambiguities and variabilities. Instead, the SBA looks to the size of the company – the number of employees.

There are sound reasons why the SBA uses number of workers to define a small mineral wool manufacturer. The number of employees is directly related to the economic viability and size of a company. For example, a mineral wool company that employs over 2,000 individuals is definitely not a small business. The number of employees reveals important facts about that entity: 1) it has sufficient income to meet the payroll demands of a large number of employees; 2) it has numerous manufacturing sites and office locations where these employees keep busy, which generally translates into extensive physical assets in such things as machinery, office equipment, and related merchandise; and 3) it has sufficient business to keep a large number of people engaged. While SBA's approach on defining a small business may not be perfect, it comes closer than any other system to accurately pinpointing the characteristics of a small business within a particular Standard Industrial Classification code.

EPA, on the other hand, is seemingly unaware of the importance of designating different standards of classifications for different industries. SBA knows each industry possesses certain characteristics. SBA's familiarity with the different industries enable them to establish criteria to

[14] While the SBA may use annual sales in conjunction with other factors, those annual sales or analyzed in the context of a specific industry, not a mixture of different types of businesses and industries.

measure which businesses would be categorized as small business concerns within an industry. It is precisely this attention to detail and a level of sophisticated understanding of the intricacy and complexity of the industrial sector that has earned the SBA a reputation with Congress and the Federal courts as an expert on small business issues. EPA demonstrates a disturbing lack of awareness of the distinct characteristics of different industries by clumping all businesses together and applying the same measuring rod to every single entity. EPA does not care whether a company is an insulation manufacturer or a metal tooling company, everyone is treated as if they were a chemical company. Since every company that comes under TSCA section 4's jurisdiction is not a chemical company, EPA needs to mirror the prudence and wisdom of SBA and create small business criteria that accounts for the variability of different industries. Of course, EPA could save itself a tremendous amount of time and tax payer dollars and simply adopt the standard created by the experts - SBA – for determining when an entity should be treated as a small business concern.

The legislative history of the Regulatory Flexibility Act likewise makes clear that EPA should apply the SBA definition of "small business" in this rulemaking. Section 601(3) defines the term "small business" as having the same definition as established by the SBA under the Small Business Act. 5 U.S.C. § 601(3). The statute permits a regulatory agency to depart from the SBA definitions, but only in exceptional circumstances that do not apply here. Congress stated that "it is the intent of the bill that agencies should first try to adopt the Small Business Act definition" because "the Small Business Administration presently possesses most of the information and expertise in the federal government concerning small business size" and "having agencies adopt the Small Business Act definition when possible, could avoid conflicts from the use of varying definitions by different agencies."[15] An agency may depart from the SBA definitions only when it can show that those definitions are "inappropriate," *id.*, which EPA has failed to do here. Most importantly, the legislative history expressly states that departing from the SBA definition of "small business" should be done "only when necessary to enable the agency to better comply with the intent of the bill and to apply the concept of flexible regulations to *more* regulations." *Id.* (emphasis in original).

EPA's attempted re-definition of small business which will have the consequence, whether intended or not, of exempting the COS test rule from the RFA and SBREFA requirements, including the requirement to adopt more flexible rules, is thus directly contrary to Congressional intent. The courts will not tolerate this type of maneuvering to escape RFA and SBREFA requirements. In a recent lawsuit against the Bureau of Land Management ("BLM"), a mining company successfully challenged BLM's certification of not impact on small businesses because the Bureau did not use the correct definition of "small entity" when it made the "no significant impact" certification. Northwest Mining Association v. Babbitt, Civ. No. 97-1013 (Dist. Ct.: D.C., May 13, 1998).

2. *Improper Threshold for Significant Impact.*

In evaluating the impacts of the HAPs test rule, EPA applied its own set of "General Criteria for Qualifying Regulatory Impacts" that considered the size of the economic impact, the number of

[15] 126 Cong. Rec. S10940 (Aug. 6, 1980).

small entities experiencing this economic impact, and the percent of all small entities affected.[16] EPA used these criteria in determining whether the proposed testing requirements would impose a "significant economic impact on a substantial number of small entities" under section 605(b) of the Regulatory Flexibility Act ("RFA") as amended by SBREFA. These criteria appear to have been developed unilaterally by EPA with no explanation of their legal or factual basis, or how they comport with the statutory requirements. Under EPA's criteria, a rule that affects less than 100 companies by definition has "no significant impact on a substantial number of small entities," no matter how large the impact on those small entities, and regardless of what percentage of all affected small entities experience such impacts. In other words, an EPA rule that would completely wipe-out an industry such as mineral wool manufacturing that is primarily composed of small entities but has less than 100 such companies would, according to EPA, have no significant impact on a substantial number of small entities.

EPA's criteria cannot be reconciled with the intent or language of SBREFA, and constitute a flagrant and ill-considered attempt by EPA to evade compliance with its statutory duties under SBREFA. Although the statute does not expressly define the terms "significant" and "substantial" as used in the certification provision of 5 U.S.C. § 605(b), the legislative history clearly does not support the extreme definitions adopted by EPA. Indeed, until SBREFA amended the Regulatory Flexibility Act and put some teeth into the statutory requirements, EPA took the position that "any impact is a significant impact, and any number is a substantial number."[17] The enactment of SBREFA, which was intended to make agencies *more* diligent in considering and minimizing where possible small entity impacts, certainly does not provide EPA a legitimate reason to adopt a position much more hostile to small business.

Under EPA's "General Criteria," which have never been legally adopted and therefore can have no preclusive effect,[18] a rule will not have a "significant economic impact" on small entities unless it imposes a cost/sales ratio exceeding 1 percent for at least 100 small entities.[19] There is no legal basis for applying such a stringent and rigid rule under SBREFA. The legislative history of the RFA expressly states that "the term 'significant economic impact' is, of necessity, not an exact test" and must be based on factors specific to each rule, such as "(1) the type of business, organization, or local government involved; (2) the compliance and reporting requirements likely to be involved; (3) the direct and indirect effects of the proposed regulation including the effect on competition; and (4) the relationship of the regulation to those issued by other programs and agencies which apply to the same class of regulated entity."[20] EPA's automatic application of a

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[16] *See* EPA, "Additional Information on Small Entity Impacts of the Amended Proposed TSCA Section 4(a) Test Rule for 21 Hazardous Air Pollutants," at 4 (Nov. 14, 1997).

[17] EPA, "Revised Guidelines for Implementing the Regulatory Flexibility Act," at 1 (April 9, 1992) (emphasis in original).

[18] *See McLouth Steel Prod. Corp. v. Thomas*, 838 F.2d 1317, 1320-21 (D.C. Cir. 1988).

[19] *See* EPA, "Additional Information on Small Entity Impacts of the Amended Proposed TSCA Section 4(a) Test Rule for 21 Hazardous Air Pollutants," at 4 (Nov. 14, 1997). See also 63 Fed. Reg. 19,694, 19,698 (April 21, 1998).

[20] 126 Cong. Rec. S 10937 (1980) (statement of Sen. Culver). The D.C. Circuit has stated that the 1980 section-by-section analysis by Senator Culver is "the only authoritative legislative history" of the RFA. *Thompson v. Clark*, 741 F.2d 401, 406 (D.C. Cir. 1984).

blanket rule defining "significant economic impact" is therefore *per se* contrary to congressional intent.

The level of impact EPA requires in order for it to be "significant" is also inconsistent with congressional intent. Congress directed that "[a]gencies should not give a narrow reading to what constitutes a 'significant economic impact'" and that "[t]he effect need not be significant on every business subject to the regulation for the total effect of a rule to be significant."[21] Congress continued:

> Likewise, a determination of significant effect is not limited to easily quantifiable cots. For example, a reporting form which requires extensive bookkeeping transactions from a customary system to one which would produce an answer in a format required by the agency *certainly* could have a significant impact on a substantial number of small businesses.

Id. (emphasis added). The Small Business Administration ("SBA") has collected other examples of agency actions that Congress has stated would have a "significant impact," including rules that (i) provide a strong disincentive to seek capital, (ii) require 175 staff hours per year for recordkeeping; (iii) result in new capital requirements beyond the reach of the entity; (iv) impose any impact less cost-efficient than another reasonable regulatory alternative; or (v) impose any impact where the adverse cost impact is greater than the value of the regulatory good.[22] All of these examples of "significant economic impact" would apply to EPA's test rule for carbonyl sulfide, whereas none of the examples would meet EPA's "General Criteria" for defining "significant impact." EPA's definition of "significant impact" therefore cannot be squared with congressional intent.

With respect to the term "substantial" number of small entities, the legislative history makes clear that the term should be defined relative to the size of the affected industry or industries. The legislative history of the RFA, provided by Senator Culver, states:

> The term "substantial number" of small entities is intended to mean substantial number of entities *within a particular economic or other activity*. In other words, it is not meant to require that agencies find that a large number of the whole universe of small businesses, small organizations and small governmental jurisdictions would be affected by a rule. One particular rule may well affect a substantial number of school districts, for example, but have no impact on small businesses or organizations. Such a rule should be considered to have satisfied this portion of the test in such an instance.

126 Cong. Rec. S10938 (1980) (emphasis added). The SBA, charged with responsibility for administering the RFA, likewise has advised agencies that "[t]o affect a substantial number, a proposed regulation must certainly impact at least one small entity," but does not "require agencies

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[21] 126 Cong. Rec. S10940 (1980) (statement of Sen. Culver).

[22] SBA, *The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies,* at 19-20 (1998) (Exhibit 3).

to find that an overwhelming percentage (more than half) of small entities would be affected."[23] EPA's criteria of requiring at least 100 small businesses to be significantly impacted in order to satisfy the "substantial number" factor therefore cannot be squared with the intent of Congress, especially with respect to an industry such a mineral wool manufacturing which has less than 100 companies. Rather, the "substantial number" factor must be evaluated relative to the total number of companies in the industry, and under the approach required by the legislative history the fact that the majority of companies in the mineral wool industry are small businesses that will be significantly impacted by the proposed test rule compels a finding that a "substantial number" of small entities will be significantly impacted.

In summary, EPA's "General Criteria" for defining a "significant economic impact on a substantial number of small entities" under section 605(b) of the RFA and SBREFA is inconsistent with the clearly expressed intent of Congress. Accordingly, EPA cannot rely on those unlawful criteria in making any certification of no significant impact under section 605(b), and the Agency has failed to provide for public comment any alternative justification for its certification that is consistent with the objectives of the SBREFA.

B. EPA's Proposed Test Requirements Will Have A Significant Economic Impact on a Substantial Number of Small Mineral Wool Manufacturing Companies.

As established above, the majority of the mineral wool companies are small business operating within an economically distressed industry. Sharing the costs of a test rule that may range, according to EPA's estimates, from $1.8 million to $3.1 million could force any number of these mineral companies out of business or into bankruptcy. The estimated costs are particularly relevant to the mineral wool companies because early indicators suggest that these companies many be forced to shoulder as much as 30 percent of the test costs. Such regulatory costs, in combination with other regulatory burdens and the precarious financial condition of mineral wool companies, which among other impacts limits access to capital, will impose a substantial economic impact on mineral wool companies.

To demonstrate the severity of the economic impact upon mineral wool producers, NAIMA contracted with the internationally recognized accounting firm of Price Waterhouse to conduct an analysis of the economic impact of EPA's proposed COS test rule. Price Waterhouse LLP had conducted an extensive survey of the rock and slag wool industry in 1996 to document the economic impact of the EPA's proposed mineral wool MACT standard. Using the data collected in 1996, Price Waterhouse analyzed the economic impact of EPA's proposed carbonyl sulfide test rule (Exhibit 4).

Price Waterhouse identified six small businesses within the industry (e.g., less than 750 employees). For each company, Price Waterhouse calculated two financial ratios: 1) estimated testing cost as a percent of 1995 revenue; and 2) estimated testing cost as a percent of 1995 net income before tax. Based on an estimate of $1.7 million for the mineral wool industry's portion of testing costs, Price Waterhouse concluded that these estimated testing costs exceeded 1.0 percent of revenues or 10.0 percent of net income before tax for five of the small mineral wool producers. For

[23] SBA, *The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies,* at 18 (1998) (Exhibit 3).

the six small businesses in the mineral wool industry combined, estimated testing costs are almost twice the 10 percent of net income before tax threshold.[24]

The results of the Price Waterhouse analysis plainly demonstrates that the mineral wool companies will suffer a significant economic impact. EPA's own apparent standard for determining whether a proposed rule will have significant economic impact is whether test costs are equivalent to 1 percent or greater of a company's annual revenue. The Price Waterhouse analysis establishes that the COS test rule will impose costs greater than 1 percent of annual revenue for five of the companies.

EPA was informed of the suspected economic impact on the mineral wool industry prior to its finalization of the Small Entity Impacts of the Amended Proposed TSCA Section 4(a) Test Rule for 21 Hazardous Air Pollutants. Subsequent to providing this information, EPA was also provided with a copy of the Price Waterhouse analysis. Despite this information, EPA still concludes that there will be no significant impact on small businesses.

To reach its conclusion of no significant economic impact, the Agency had to stretch fundamental accounting and tax principles beyond recognition. EPA explains its unique approach to calculating the annual impact of test rule costs in the preamble: "To calculate the percent price impact, testing costs (which include both laboratory and administrative expenditures) are annualized over fifteen years using a 7 percent discount rate. Annualized testing costs are then divided by the total supply of the HAP chemical to derive the annualized unit test costs. The percent price impact is calculated by dividing the annualized unit test costs by the sales price and multiplying by 100."[25]

When initially informed of EPA's method of annualizing costs over a fifteen year period, members of the mineral wool industry were puzzled. Different company representatives consulted with their financial advisors and accountants. Each representative returned with the same story: It is not standard practice in the business world to amortize a non-capital investment over a fifteen year period.

To validate the conclusions of the professional accountants representing the different companies, NAIMA again turned to the expertise of Price Waterhouse. NAIMA's assignment for Price Waterhouse was to analyze the appropriate accounting and tax treatment of costs incurred under TSCA for testing (Exhibit 4).

By way of background, the Price Waterhouse analysis assumes that the Chemical Manufacturers Association, a tax-exempt trade association that is coordinating COS-emitting industries, will collect a special assessment from the various manufacturers who are required to participate in the EPA's HAPs COS testing. CMA will then contract with an independent lab to perform the testing on behalf of various manufacturers. The participants are expected to pay their portion of the test costs during the test period. In other words, CMA, like other organizations similarly situated, do not set up a payment plan for the participants and allow them to pay off their test costs as if it were

[24] These estimates were based on the Agency's original proposal published in June 1996. While the Agency's December 1997 re-proposal includes a somewhat lower estimate for COS test costs, this reduction does not qualitatively change the impacts of EPA's rule.

[25] 62 Fed. Reg. 67,466, 67,477-78 (December 24, 1997).

a house mortgage or an installment on a car loan. Indeed, CMA would be hard pressed to find a lab or testing facility in the United States that would conduct business in this manner. Therefore, the mineral wool companies and any other entity required to share test costs will be expected to pay their apportioned amount while the testing is being conducted.

Such a practice is certainly consistent with NAIMA experience with testing facilities. NAIMA has conducted research on the safety of its products for nearly sixty years. NAIMA has found that testing facilities throughout the world consistently demand payment prior to the commencement of the study. In fact, most testing facilities demand at least 25 percent of the test costs prior to commencement of the testing and all remaining installments to be paid before completion of the study.

Given the scenario of how mineral wool companies will be required to pay, Price Waterhouse reviewed existing and historical practices within the professional accounting and tax world. Based upon its research, Price Waterhouse concluded that since HAPs testing is not creating an asset, extending the life of an existing asset, or preparing an asset for sale, the appropriate treatment to the various manufacturers would be to expense the testing costs as incurred. Given this accounting treatment plus the fact that the HAPs testing is not producing a long-term benefit for the various manufacturers, the costs are not chargeable to a capital account under IRC section 263(a), but instead are deductible as an ordinary and necessary business expense under IRC section 162.

As this analysis suggests, EPA has employed a faulty method in determining the potential economic impact upon small businesses. Therefore, NAIMA requests that the EPA prepare another economic assessment that applies a method of calculating the percentage of price impact that is accepted and employed in the real world.

C. EPA Failed to Comply to With the Procedural And Substantive Requirements of SBREFA

EPA certified under section 605(b) that its test rule would not have a "significant economic impact on a substantial number of small entities," and based on such certification, refused to comply with any of the procedural or substantive requirements of SBREFA. If EPA's certification was improper, therefore, the Agency is in clear violation of the law. EPA's certification of the COS test rule was both legally and factually defective, as EPA applied improper re-definitions of "small business," "significant economic impact," and "substantial number of small entities." Likewise, EPA's amortization over 15 years of the lump-sum payments that companies will have to pay for carbonyl sulfide testing is inconsistent with well-established accounting practice. Finally, despite EPA's clearly erroneous finding that zero small entities will be subject to test costs for carbonyl sulfide,[26] the factual record clearly shows that small business mineral wool companies will be significantly impacted by EPA's proposed test rule.

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[26] EPA, "Additional Information on Small Entity Impacts of the Amended Proposed TSCA Section 4(a) Test Rule for 21 Hazardous Air Pollutants," at 11 (Nov. 14, 1997).

Congress amended the RFA with SBREFA in 1996 precisely to prevent such agency circumvention of the letter and spirit of the RFA requirement to consider and minimize the economic impact of rules on small businesses by using technicalities to improperly certify that rules will not have a significant impacts on small entities. Congress found that the requirements of the RFA to consider and minimize regulatory burdens on small entities "have too often been ignored by government agencies, resulting in greater regulatory burdens on small businesses than necessitated by statute." Pub. L. No. 104-121, § 202(5). In particular, Congress found that agencies were abusing the section 605(b) provision for certifying that a proposed rule will not have a significant economic impact on a substantial number of small entities. See, e.g., 142 Cong. Rec. H2987, H3016 (Mar. 28, 1996) (statement of Rep. Ewing) ("Federal agencies were routinely using a loophole in the law which allows them to publish a statement in the Federal Register certifying that their regulation does not affect a significant number of small entities, and therefore allowing the agency to avoid conducting the analyses required by the RFA .... Herein lies the Achilles heel of the RFA."); 142 Cong. Rec. S2148, S2155 (daily ed. March 15, 1996) (statement of Sen. Bumpers) (agencies "would simply say these regulations are not unduly burdensome on the small business community; therefore, they did not have to do anything more to accommodate the burden of that regulation on small business."); 142 Cong. Rec. H2987, H3004 (daily ed. March 28, 1996) (statement of Rep. McIntosh) ("Federal agencies often ignored the mandate of the [RFA] and refused to prepare a regulatory flexibility analysis").

By certifying that the COS test rule would not have a significant impact on small entities, despite the very real burdens that such a rule would impose on small mineral wool companies, EPA is committing precisely the type of agency wrongdoing that Congress specifically intended to stop in the 1996 SBREFA amendments. Based on its erroneous certification, EPA refused to conduct an initial regulatory flexibility analysis, shows no inclination to publish a final regulatory flexibility analysis, and failed to conduct the small advocacy review panel required by section 609(b) for its re-proposal of the COS test rule. These violations of law are not merely procedural. As the SBA has stated, "[t]he RFA establishes an analytical process, not merely procedural steps, for analyzing the impact of regulations on small entities....The law anticipates that something substantive will emerge from the process to ensure that public policy is enhanced."[27]

In particular, SBREFA amended the requirements for regulatory flexibility analyses to require:

> a description of the steps the agency has taken to minimize the significant economic impacts on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

5 U.S.C. §604(a)(5). Application of this legal requirement to the COS test rule would easily identify several less burdensome alternatives that would nevertheless satisfy EPA's programmatic objectives for requiring carbonyl sulfide testing, as set forth in greater details in the comments by the CMA COS Panel.

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[27] SBA, *The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies,* at 9 (1998) (Exhibit 3).

The most obvious alternative that EPA should consider under SBREFA is to defer any test rule for carbonyl sulfide while the NTP proceeds with its test program on carbonyl sulfide, which EPA recommended. It is inefficient to require small businesses to incur significant expense to duplicate test programs that fully or partially overlap tests that are already being undertaken by the federal government. Other less burdensome alternatives for small entities include a tiered testing approach similar to that which EPA has accepted under other TSCA § 4 test rules, using a less burdensome reduced protocol or a transgenic model for the carcinogenicity tests proposed for carbonyl sulfide, and/or to delay the carbonyl sulfide test rule until all emitters of carbonyl sulfide have been identified.

EPA violated SBREFA and the RFA by failing to consider these less burdensome alternatives and not complying with the requirements of the statute to identify affected small businesses and their impacts. Any attempt to impose testing requirements based on the flawed findings in the proposed rule would therefore be unlawful. Unless EPA takes immediate action to meet with small businesses and consider less burdensome alternatives for such entities, EPA's proposed test rule for carbonyl sulfide will remain legally flawed and unduly burdensome.

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FOREWORD

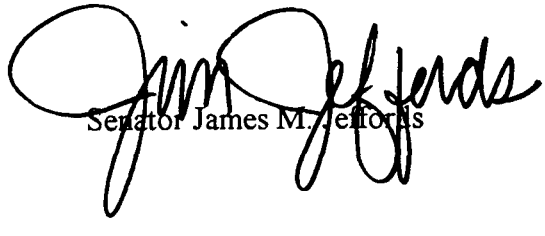
BY SENATOR JAMES M. JEFFORDS

It is increasingly clear that environmental protection has become a core value of the American people. There are many ways to reduce our impact on the environment: in the past we have focused on controlling and reducing pollution after the fact, through auto tailpipe controls, smokestack scrubbers, wastewater treatment, recycling waste, and other means. For the future, however, we need to prevent pollution, not just clean it up. Products designed for recycling, production processes that minimize waste, and low-emission vehicles are examples of technology solutions that serve this purpose.

One of the most broadly-applicable and cost-effective ways to prevent pollution is to increase the energy efficiency of our homes, businesses and factories through better insulation and other technologies. Reducing energy use reduces the air pollution that typically comes with it. Saving energy saves money, making energy efficiency cost-effective in its own right. Efficiency also enhances our national security by reducing our dependence on imported energy. As Co-Chairman of The Alliance to Save Energy, I am thus pleased that the Alliance was able to play a part in the study that produced this timely report on the energy and environmental benefits of insulation.

The report shows that fiber glass, rock wool, and slag wool insulation installed in our buildings and factories not only saves a huge amount of energy, it also avoids emissions of such air pollutants as sulfur dioxide and carbon dioxide. Preventing this pollution helps meet our Clean Air Act goals while providing no-risk insurance against the threat of global climate change.

Beyond demonstrating the benefits of insulation, this report also illustrates the important role the insulation industry plays in advancing the competitiveness of our economy and the quality of our environment. This industry, in addition to creating thousands of jobs, uses recycled material for a large and growing share of its inputs, and produces products that save energy, money, and pollution. For these reasons the insulation industry embodies the spirit of the Alliance's recent public service campaign: "Save energy--save earth--save jobs--save money."



Senator James M. Jeffords

GREEN AND COMPETITIVE

This report was prepared by Energy Conservation Management, Inc., The Alliance to Save Energy and Barakat & Chamberlin, Inc. for The North American Insulation Manufacturers Association (NAIMA). NAIMA is a trade association of North American manufacturers of fiber glass, rock wool and slag wool insulation products. NAIMA's role is to promote energy efficiency and environmental preservation through the safe manufacture and use of fiber glass, rock wool and slag wool insulation products.

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TABLE OF CONTENTS

PAGE

INTRODUCTION

Increasing the energy efficiency of U.S. buildings and industrial facilities is an important part of U.S. energy policy, aiding in the attainment of such national goals as a stronger economy, greater national security and improved environmental health. The primary purpose of this study is to demonstrate the net energy, economic and environmental benefits of fiber glass, rock wool and slag wool insulation products. However, this examination also reveals that the U.S. insulation industry, by manufacturing products whose utilization leads to greater savings in energy and pollution than are used and created through their own production process, is a leading industry. It not only contributes to a strengthened U.S. economy and to increased monetary savings for consumers, but also to an improved state of the national and global environment.

This study begins by assessing the amount of energy used in the manufacture of these insulation products, and then determines the energy that is saved through their application in residential and commercial buildings and other end uses. Also examined is the individual sector with regard to energy use and energy saved annually, as well as the aggregate carbon dioxide emissions avoided through the use of insulation products in the residential, commercial and industrial sectors.

Energy input analysis for the study was determined based upon the amount of energy used in the insulation production process and was obtained by surveying the member companies of the North American Insulation Manufacturers Association (NAIMA). Extraction, refining, transportation and distribution energy used in the manufacturing process was not analyzed. The energy input data was separated by product type, and an average energy use per pound of product was determined from the collected data. Environmental impacts were determined in a similar manner and are based upon air pollution resulting directly from consumption of energy used in the production process.

Building and end-use analysis has been separated into residential, commercial and industrial portions. The residential and commercial analyses were performed using computer simulation models to represent the energy usage of the current building stock. These models were then modified to represent these same buildings containing no insulation, and then again with additional insulation to represent compliance of these buildings with the Model Energy Code (MEC) and ASHRAE 90.1. In order to simplify the analysis to a task that could be reasonably performed, some assumptions were made. A limited number of prototype buildings were selected to represent the residential and commercial building stock for this analysis, and representative cities were chosen in which to run the building model analyses. The individual characteristics, insulation packages, and energy consumption of the existing building stock varies greatly and this study represents the energy usage patterns on average.

The study also analyzes the economic potential for industrial pipe and vessel insulation in the U.S. manufacturing sector. This analysis is based mainly upon an existing database of industrial energy audits. This database was carefully assessed and conclusions were drawn about the

potential savings in the industrial sector due to insulation measures. The study conservatively estimates an aggregate economic potential savings. However, the results of an individual plant will vary greatly.

As a whole, this study aims to show that for each sector, insulation is a cost-effective, energy saving measure. Through improved insulation, residential and commercial consumers do reduce their energy use, and therefore save money through lower energy bills. Insulation also increases manufacturing efficiency by cutting energy losses and production costs in the industrial sector. In addition, insulation improves the comfort levels of buildings year-round while contributing to environmental awareness and strengthened environmental quality. For each and all of these reasons, U.S. insulation manufacturers contribute significantly to support our nation's important economic and environmental goals by remaining an industry that is both green and competitive.

EXECUTIVE SUMMARY

Green and Competitive

The Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products

The need for a strong industrial economy often appears to conflict with environmental goals. However, this view underestimates the power of manufacturers to innovate in response to competitive pressures. Many companies have already shown the ability to use raw materials, energy, and labor resources more productively, thus reducing environmental impacts and bypassing the stalemate between the bottom line and the environment. These companies have found that this enhanced resource productivity makes them more rather than less competitive.

The U.S. insulation industry is an excellent example of a manufacturing sector that reverses the traditional trade-off between the environment and the economy, proving that large industry can be both green and competitive. The industry ships over 5 billion pounds of product annually, made by more than 160 companies in the United States. Fiber glass, rock and slag wool insulation manufacturers who are members of the North American Insulation Manufacturers Association (NAIMA) account for more than half of the industry's output, producing over 3 billion pounds of insulation annually valued at $3.1 billion. NAIMA members employ more than 10,000 people, and support 20,000 to 30,000 additional jobs in the distribution and installation sectors.

Insulation Creates Enormous Net Energy Savings

Insulation manufacturing uses a substantial amount of energy. Yet a typical pound of insulation saves twelve times as much energy in its first year in place as the energy used to produce it. Nearly 33 trillion Btu of energy are consumed by NAIMA members annually to manufacture insulation products. But the insulation produced each year saves about 400 trillion Btu annually; the ratio of these two figures is about 12 to 1. That's just in the first year; over its lifetime, insulation saves hundreds of times the energy used to make it.

The cumulative insulation products installed in U.S. buildings save consumers about 12 quadrillion Btu annually, or about 42 percent of the energy that would have been consumed with no insulation in place. 12 "Quads" is almost 15% of total national energy use; it's enough energy to supply the total energy requirements of Florida for 4 years.

Energy Savings Translate into Dollar Savings

These energy savings add up to big dollar savings. Current insulation levels save consumers nearly $84 billion dollars a year in heating and cooling costs. That means U.S. homeowners are avoiding approximately $74 billion dollars in energy costs every year, or about $780 per household. Homeowners in the United States typically spend $1,200 on energy each year; without insulation they would spend about $2,000. Current insulation levels have therefore helped cut residential energy bills by forty percent. Commercial building owners are also saving money on their heating and cooling bills - - over $9.6 billion dollars a year nationwide, or about $2,100 a year per building.

Insulation is Good News for the Environment

The energy savings from insulation products is also good news for the environment. By reducing the energy needed to heat and cool homes and commercial buildings, insulation avoids carbon dioxide emissions, which contribute to global climate change. Other air pollutants, such as sulfur dioxide and nitrogen oxides, are also avoided. Energy use by the insulation industry emits 4.74 billion pounds of carbon dioxide during a year's insulation production; however, the insulation produced in that same year avoids twelve times that amount, or about 57 billion pounds.

Cumulatively, installed insulation in U.S. buildings prevents the emission of over 1.56 trillion pounds of carbon dioxide annually. Since pollution avoidance parallels energy savings, that means that total U.S. carbon dioxide emissions would be almost 15% higher without insulation. Over its lifetime, this insulation will avoid more pollution than it creates by several hundred fold.

The insulation industry's record of achievement on resource conservation is also visible in its substantial and growing use of recycled materials. Fiber glass insulation manufacturers currently average about 30 percent recycled glass (cullet) content. That percentage is reported to be increasing; some manufacturers already use up to 40%. Using recycled materials not only reduces production costs, it also saves space in landfills. In 1994, the use of recycled materials in the insulation industry saved over 33 million cubic feet of landfill space.

Insulation Producers Invest in Energy Efficiency

Insulation manufacturers make a product that saves many times the energy used in production. However, to become more competitive and make better use of resources, these companies have also invested in their own internal energy efficiency. Using advanced production techniques, controls, and modern energy management methods, in the last decade mineral insulation

producers have reduced the amount of energy needed to produce a pound of insulation by an average of 17%. The 10,000 Btu needed to make a pound of product today is the lowest it has ever been.

Further Energy Savings Can Be Achieved Through Insulation

Though existing insulation is saving enormous amounts of energy and pollution, there remains substantial potential for cost-effective investments in building and industrial insulation. This study shows that it is possible to save an additional 2.2 quadrillion Btu of energy and avoid an additional 294 billion pounds of carbon dioxide annually. That's almost 3% of total national energy use.

For example:

- If all residential buildings were insulated according to the latest version of the Council of American Building Officials' Model Energy Code, 2 quadrillion Btu in additional annual energy savings would be realized.
- If commercial buildings were insulated to ASHRAE Standard 90.1, an additional energy savings of 260 trillion Btu annually could be realized.
- Finally, if industrial plants installed insulation everywhere it was economically cost-effective for them to do so, approximately 51 trillion Btu of energy could be saved annually.

These energy savings would avoid substantial amounts of air pollution as well.

Obviously, insulation has been a great investment for the U.S. economy and for individual consumers, in terms of energy savings, dollar savings, and pollution reduction, and should be considered a key resource in the cause to increase our energy efficiency and improve our environment.

ENERGY CONSUMPTION IN INSULATION MANUFACTURING

INTRODUCTION

This portion of the study estimates the energy used per pound of product in the insulation manufacturing operations of NAIMA members. The resulting data is used in subsequent sections to compare the amount of energy used in the manufacturing process with the amount of energy saved by insulation products in field applications. The analysis is based on a survey of NAIMA member energy usage, collected from 8 member companies operating 21 production sites. Data reported by these companies reflects more than 90% of total industry production for fiber glass, rock wool and slag wool. This sample thus comprises the vast majority of insulation production volume in the industry, and this constitutes a representative sample of insulation manufacturing practice. The survey data was collected and reported by NAIMA member companies; it has been reviewed for statistical validity but not for primary data accuracy.

The Mineral Insulation Industry

The industry that manufactures fiber glass, rock wool and slag wool insulation from mineral fibers is a substantial contributor to the world economy. It produces $3.2 billion of products and employs 19,100 people.[1] While the industry uses large amounts of raw materials such as sand, it also uses an increasing amount of recycled material. A recent NAIMA industry survey[2] indicates that the industry used more than 1.5 billion pounds of recycled glass and slag in its 1993 production of thermal and acoustical insulation. Since the industry produces just over 3 billion pounds of thermal insulation products, recycled material clearly accounts for a substantial portion of the industry's output.

The manufacturing of such insulation materials is energy-intensive. For example, fiber glass manufacturing can include batch preparation, melting and refining, forming, and post-forming. According to a Congressional Office of Technology Assessment (OTA) report,[3] the amount of energy required for a finished fiber glass product was approximately 12,255 BTU/Lb. in 1985. Given advances in production technology, the OTA projects state-of-the-art fiber glass production methodologies to lower consumption to 10,780 BTU/lb. These figures assume that purchased electricity is counted at 10,500 BTU/Kwh, including generation and transmission losses. The OTA study accounts for manufacturing process energy use, but does not consider energy used in the distribution or the transportation of material from production to distribution sites.

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[1] U.S. Department of Commerce. Bureau of the Census. *1992 Census of Manufacturers.*

[2] 1995 Confidential survey of insulation manufacturers conducted for NAIMA by Cadwalader, Wickersham, and Taft.

[3] U.S. Congress. Office of Technology Assessment. *Industrial Energy Efficiency.*

METHODOLOGY

Data was collected using a survey instrument (see Appendix A) designed to collect energy usage, production and distribution information. NAIMA member companies were surveyed for 1991, 1992, and 1993, and we received responses from 8 companies representing 21 total sites. These eight companies comprise both the majority of NAIMA members and a very high percentage of total industry production.

Information on residential, commercial and industrial building products, duct insulation products, and metal building products was collected, as well as on types and volumes of energy consumed by production processes at each site. Information was also sought to aid in the compilation of data on shipping modes, tonnage and the costs of shipping the finished products to regional distribution centers.

Data Compilation and Processing

As NAIMA member companies returned completed survey forms, raw data was entered into a Statistical Package for the Social Sciences (SPSS) database. We applied the appropriate BTU equivalent conversion factors and adjusted volume and weight with standard conversions. Table 1 lists the energy conversion factors used.

TABLE 1
ENERGY CONVERSION FACTORS[4]

Fuel	BTU Equivalent
1 Kwh[5]	10,600
1 Therm	103,200
1 U.S. Gallon Oil (Residual)	149,700
1 U.S. Lb. Coke[6]	13,000
1 U.S. Gallon Propane	91,600

[4]Except where noted, all energy adjustment factors from, "Energy Reference Handbook," 2nd Edition; Government Institutes, Inc.; 1977.

[5]OTA report.

[6] Survey participant provided BTU conversion.

After converting the raw energy usage data into BTU equivalents, we calculated preliminary estimates of BTU consumption per pound of product for each manufacturing site. We then validated these preliminary estimates against the OTA 1985 estimate of 12,255 BTU/Lb. When this validation produced anomalous figures, we rechecked primary data for accurate entry, appropriate BTU conversions, and other possible sources of error. In some cases we consulted individual NAIMA members to verify data accuracy.

This validation process resulted in some data corrections and in the removal of some sites from the sample. Sites were removed when it was determined that production and energy usage patterns were not representative of the industry. For example, such sites producing material for R&D purposes, where the product was not reported in shipping, were taken from the sample. We eliminated additional sites where products were extremely specialized and not representative of the products evaluated in our analysis of energy savings for insulation products in field applications.

These revisions resulted in total volumes of both production and energy usage that are slightly smaller than they would have been had all sites been included in the study, however the key results in terms of energy used per pound of product are not significantly affected. Moreover, because the sites removed were deemed anomalous for various reasons, their removal improves the validity of the results.

Once the data were fully reviewed and validated, we conducted standard statistical analyses, such as means and variances, using the SPSS analysis programs. These results were aggregated to industry averages to preclude identification of individual company or site information.

Table 2 summarizes insulation production information collected in the survey. The table shows that residential building products dominate the industry in terms of pounds produced; about two-thirds of total production is accounted for by residential products. Product types are defined as follows:

- Commercial Building Products are typically roll, batt and board products applied in various commercial building applications.

- Commercial Pipe Products are specialized, higher-density products typically used for insulating high- or low-temperature piping for steam, hot water, chilled water and process piping.

- Duct Insulation Products include board and roll products designed to insulate HVAC air distribution ducts in residential and commercial applications.

- Metal Building Products are specialized for application in commercial metal buildings.

- Residential Building Products include rolls, batts and loose fill insulation for use in new and existing homes.

TABLE 2
TOTAL INSULATION PRODUCTION
BY YEAR AND PRODUCT TYPE
(Data reported in Lb.)

PRODUCT TYPE	1991	1992	1993	3 YEAR AVERAGE
Commercial Building Products	148,985,200	170,047,800	129,191,598	149,408,199
Commercial Pipe Products	133,408,968	175,192,193	211,230,992	173,277,384
Duct Insulation Products	231,630,000	254,180,997	263,931,997	249,914,331
Metal Building Products	104,074,000	122,568,996	144,034,990	123,559,329
Residential Building Products	2,025,112,796	2,274,286,206	2,430,917,000	2,243,438,667
Other Products	246,913,200	250,850,600	128,244,396	208,699,399
TOTALS	**2,890,124,164**	**3,247,126,792**	**3,307,550,973**	**3,148,267,310**

Table 3 is a summary of energy usage figures for the study sample. Electricity clearly accounts for the largest portion of input energy to the production process, accounting for two-thirds of the total primary energy used. The role of electricity is somewhat exaggerated, however, by the use of the "source" BTU conversion method. Based on the "site" energy value of electricity, it would be second to natural gas in energy used in the production process.

TABLE 3
TOTAL ENERGY CONSUMPTION
(Reported in Million Btu)[7]

Energy Type	1991	1992	1993	3 Year Average
Electricity	21,163,149	22,149,540	23,415,106	22,242,598
Natural Gas	9,569,098	9,898,014	10,457,895	9,975,002
Oil	37,497	44,802	40,452	40,917
Coke	136,851	115,858	291,242	181,317
Propane	55,590	67,003	46,732	56,442
Oxygen	116,403	174,741	209,222	166,789
Total	**31,078,588**	**32,449,958**	**34,460,649**	**32,663,065**

Table 4 profiles energy usage per pound for the study sample over the three-year study period.

TABLE 4
AVERAGE ENERGY USAGE PER POUND OF PRODUCTION

	1991	1992	1993	3 Year Average
Total Energy (Million BTU)	31,078,588	32,449,958	34,460,649	32,663,065
Total Production (Thousand Lb.)	2,890,124	3,247,127	3,307,551	3,148,267
Mean BTU/Lb.	10,753	9,993	10,419	10,389

[7] Million BTU calculated using an assumption of 10,600 BTU per kWH for electricity.

Energy Efficiency of Insulation Production is Increasing

Although fiber glass, rock wool and slag wool are energy-intensive products, the insulation industry has made substantial gains in the energy efficiency of production. Table 4 shows that average energy usage per pound is 15% lower for the 1991-93 period than the OTA 1985 estimate of 12,225 BTU/Lb. It is also slightly less than OTA's 10,780 BTU/Lb. estimate for "state-of-the-art" production methods. This result indicates that NAIMA members have improved energy efficiency substantially in the last decade, and are producing insulation using relatively efficient technology.

Insulation Production is Electricity-Intensive

On a source-BTU basis, insulation manufacturing uses electricity for two-thirds of its primary energy inputs. Electricity and natural gas together account for more than 98% of total insulation manufacturing energy use. Since these are relatively "clean" fuels at the point of use, insulation manufacturing produces less particulate and sulfur emissions than many primary manufacturing industries that use more coal and oil.

Residential Products Lead Industry Production

Residential insulation, in the form of batts, rolls and loose fill, accounts for about two-thirds of total industry production. This means that the majority of the energy and environmental benefits of insulation products go directly to residential consumers.

RESULTS

Analysis of the survey data produced aggregate profiles of NAIMA member company production and energy use. Table 2 displays the distribution of production volumes for the survey sample.

Statistics reported in this section are based upon combined fiber glass, rock wool and slag wool production and energy usage data, but because the overwhelming majority of product volume in the industry is fiber glass, the effect of the rock and slag wool production on the industry's average energy usage in production is minimal. Hence, the totals and averages reported in this study are more characteristic of energy use in fiber glass production. This is appropriate, since fiber glass products dominate the building insulation market, and this is where most of the study's energy savings analysis is focused.

RESIDENTIAL

INTRODUCTION

Increasing the energy-efficiency of the residential sector has been an important element of U.S. energy policy since the oil embargo of the 1970s and the natural gas shortages of the 1980s. Fuel shortages and price increases have focused the nation's attention on the critical role of energy in the residential sector. Over the last two decades, increased efficiency levels of shell insulation packages, as well as other aspects of energy efficiency in residential design, have become a construction standard through the enforcement of building codes and through market forces. The end result has been more comfortable housing, reduced pollution, and lower energy bills.

Shell insulation packages, as well as a number of other end uses, were formerly recognized as being inefficient, but the average household today contains appliances, boiler/furnaces, air conditioners and shell sealing practices which all carry greatly improved energy-efficiency ratings. Although the average floor area of homes has increased and many more homes contain central air conditioning, larger appliances such as refrigerators, and new electronic equipment such as computers, video cassette recorders and dishwashers, these big improvements in equipment efficiency have resulted in a decrease in the overall energy use per household. Utility company initiatives such as the Comfort Home program (MET-Ed/Penelec) and Energy Wi$e New Home Program (BGE) are further increasing the overall energy efficiency of new construction.

This residential analysis determines the energy savings resultant from current insulation levels in the existing single family housing stock (baseline compared to units that have not been insulated) and assesses the theoretical potential energy savings of bringing all homes into compliance with the Council of American Building Official's (CABO) Model Energy Code (MEC).

METHODOLOGY

These objectives were achieved through four analytical steps. First, a typical (baseline) single family detached home for various climate regions was created based on the best available housing characteristics and energy usage data. Second, a baseline energy simulation model using typical weather data was then constructed; it was calibrated by comparing its output to DOE's total single family detached energy usage data. Third, the model was run for a typical home without wall, roof, floor or slab insulation, in order to calculate the change in energy usage from the baseline. Finally, the model was run once more with the model home's insulation upgraded to the standards of CABO's 1992 Model Energy Code (MEC); again, the change in energy usage from the baseline was calculated. These four steps estimate the total energy saved by insulation currently in place and the potential energy savings achievable through upgrades to MEC levels.

Data Compilation and Processing

Five residential building models were run in eleven cities: Denver, Detroit, Fresno, Knoxville, Los Angeles, Minneapolis, Orlando, Phoenix, Providence, Seattle, and Shreveport. Each of these cities fall into a particular census region as shown below in Table 5. Because the amount of climate variation differs within each census region, the number of cities in each region varies from one to five. While the Northeast has a relatively uniform climate, the West ranges from a very warm climate in southern California to a very cold climate in Colorado.

TABLE 5
REPRESENTATIVE CITY LIST

Midwest	Northeast	South	West
Detroit	Providence	Knoxville	Denver
Minneapolis		Orlando	Fresno
		Shreveport	Los Angeles
			Phoenix
			Seattle

The single family detached home represents over 61% of all households nationwide, and has therefore been used to represent the residential sector for this analysis. When single family attached homes, mobile homes and 2 to 4 unit multifamily units are combined with detached homes, this number increases to over 83%[8]. The methods used for the building construction of these household types are relatively similar, and so the net effectiveness of insulation on a percentage basis has also been assumed to be comparable for all groups. Furthermore, since the above 83% of the residential sector represents a vast majority, we have applied the calculated percent savings to the entire sector when calculating total effectiveness.

A typical detached single family home was created for each of the eleven cities and four regional zones in an REM/design (Residential Energy Analysis Software), a residential energy simulation model. We used the same house type for locations which have similar building characteristics. Basic housing characteristics were adopted from the 1989 American Housing survey. We collected additional data through telephone interviews conducted with utility companies in each of the eleven cities. The utilities were asked what characteristics were used for their existing home baseline, and most reported that they use the current local building code as the residential baseline.

The baseline home we used for our modeling purposes is a single-story home with a 1,688 square-foot finished area, all four walls of equal area and a window area of 15%. Depending upon the predominant foundation for the region, the foundation type was either full basement, slab on grade or crawl space. The baseline building that was modeled for each region represents the average construction type of that region. The housing stock of local areas will vary widely

[8] DOE Energy Information Administration/ Household Energy Consumption and expenditure 1993 pg. 37

and is dependent on building site, however the model has been developed to represent the energy usage and not the specific construction of the existing housing stock. Table 6 contains a summary of the baseline building used for each region:

TABLE 6
BUILDING CHARACTERISTICS BASELINE SINGLE FAMILY DETACHED HOME

Energy Features	Northeast Providence	West Denver	West Fresno, LA, Phoenix, Seattle	North Central Detroit, Minneapolis	South Knoxville, Orlando, Shreveport
Ceiling w/ Attic	R-19 Batt	R-19 Batt	R-11 Batt	R-19 Batt	R-11 Batt
Walls Avg. Ins.	R-11 Batt	R-11 Batt	R-6 Batt	R-11 Batt	R-6 Batt
Window, Frame	Single, Storm, Wood	Single, Storm, Wood	Single, Wood	Double, Wood	Single, Metal
Window Shading	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50
Frame Floors Ave.	R-11 Batt	R-11 Batt	R-5.5 Batt	R-11 Batt	R-3.4 Batt
Slab Floors	None	None	R-0 per	None	R-0 per
Infiltration	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated
Heating System	Gas, AFUE 70%	Gas, AFUE 70%	Gas, AFUE 70%	Gas, AFUE 70%	Gas, AFUE 70%
Cooling System	Elec. A/C SEER 8	Elec. A/C SEER 8	Elec. A/C SEER 8	Elec. A/C SEER 8	Elec. A/C SEER 8
Ducts Average	R-2	R-2	R-2	R-2	R-2
Water Heater	Gas	Gas	Gas	Gas	Gas

As shown on the table, one of the above five typical baseline home models was run for each of the eleven cities using the REM modeling program. For all cities, the calculated weighted average energy usage per home for heating and cooling is 93.38 MMBtu, and the average household uses 36 MMBtu of energy for typical water heating consumption and miscellaneous energy. Together, these uses total an average energy usage of 126.89 MMBtu per home. According to the DOE Energy Information Administration/Household Energy Consumption and Expenditure 1993, the average energy consumed per single family detached household was 121.2 MMBtu[9]. The calculated results are within 5% of the national data and can therefore be considered reasonable.

The results of the various REM modeling runs were used to calculate the weighted average energy consumption that represents the typical home (baseline). The weighting was accomplished by adding the average energy contribution of each representative city's home to its regional average and then adding together the weighted average of every region to obtain a total typical average. The data used to create a weighted average includes the percentage of households, percentage of buildings, and percentage of square footage per region[10]. Also included in the analysis was a corrected percentage for households with air conditioning[11] of approximately 66%.

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[9] DOE Energy Information Administration/ Household Energy Consumption and Expenditure 1993 pg. 37

[10] DOE Energy Information Administration/ Household Energy Consumption and Expenditure 1993 pg. 37

[11] EEBA Special Reprint of Energy and Housing Report 1995 by Allen L. Frank Associates pg. 3

In order to demonstrate the energy-saving effects of increasing the insulation of a typical average home to current levels, the baseline models were adjusted by removing all insulation from the walls, roof, slabs and floor. The difference between these total averages represents the change in energy usage from a home with typical insulation levels to one containing no insulation.

The residential building characteristics of the prototypes were adjusted in order to represent compliance with the CABO Model Energy Code for each city. The building characteristics used for the CABO Model Energy Code runs are summarized below in Table 7. The energy savings that result from adoption of CABO Model Energy Code standards can come from changes to the building other than insulation such as furnace and cooling system efficiency and window improvements. However, the component consumption report in the REM/Design program was used to quantify only the energy savings resulting from insulation.

In the final step of the analysis was a calculation of the percent change in the model from typical insulation to no insulation, and then from typical insulation to compliance with the CABO Model Energy Code. For each scenario, we multiplied the total energy consumed in the residential sector by this percent change to determine the total energy savings.

TABLE 7
BUILDING CHARACTERISTICS CABO SINGLE FAMILY DETACHED HOMES

Energy Features	Northeast Providence	West Denver	West Fresno	West Los Angeles	West Phoenix
Ceiling w/ Attic	R-38 Batt	R-38 Batt	R-26 Batt	R-19 Batt	R-30 Batt
Frame Walls	R-19 Batt	R-19 Batt	R-13 Batt	R-11 Batt	R-13 Batt
Window, Frame	Double, Low-e Wood	Double, Low-e Wood	Double, Wood	Double, Wood	Single, Wood
Window Shading	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50
Frame Floors	R-19 Batt	R-19 Batt	R-13 Batt	R-11 Batt	R-13 Batt
Slab Floors	None	None	R-4 per	R-0 per	R-2 per
Infiltration	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated
Heating System	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%
Cooling System	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10
Ducts	R-6.5	R-3.3	R-5	R-3.3	R-3.3
Water Heater	Gas	Gas	Gas	Gas	Gas

Energy Features	West Seattle	North Central	South Knoxville	South Orlando	South Shreveport
Ceiling w/ Attic	R-30 Batt	R-38 Batt	R-30 Batt	R-19 Batt	R-19 Batt
Frame Walls	R-13 Batt	R-19 Batt	R-13 Batt	R-13 Batt	R-13 Batt
Window, Frame	Double, Low-e, Wood	Double, Low-e, Wood	Double, Low-e, Wood	Single, Wood	Double, Wood
Window Shading	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50	H: 0.50, C: 0.50
Frame Floors	R-19 Batt	R-30 Batt	R-19 Batt	R-11 Batt	R-13 Batt
Slab Floors	R-4 per	None	R-4 per	R-0 per	R-2 per
Infiltration	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated	0.70 Estimated
Heating System	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%	Gas, AFUE 78%
Cooling System	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10	Elec. A/C SEER 10
Ducts	R-5	R-3.3	R-4.2	R-8	R-4
Water Heater	Gas	Gas	Gas	Gas	Gas

RESULTS

The analysis shows that existing levels of insulation in the national stock of single family detached homes has saved approximately 51% of the total energy usage as compared to these same homes without insulation. This 10.41 quads of savings has a substantial effect on local and global air pollution through reduced particulate, carbon and sulfur emissions. Theoretically, if all of these homes were insulated up to CABO Model Energy Code standards, an additional 19% (1.36 Quads) of energy will be saved. We have used this data to extrapolate the potential savings for the entire residential sector, and found that current total energy use in the residential sector for heating, cooling, lighting, domestic hot water and other miscellaneous uses is estimated to be about 10.0 quads. After extrapolating from the single family detached results, we have estimated that insulation is saving 10.41 quads per year. The potential for an additional 1.90 quads of energy savings exists if the entire housing stock were to adopt the CABO Model Energy Code standards.

A summary of energy savings for the residential sector is provided in Table 8:

TABLE 8
SUMMARY OF RESIDENTIAL SECTOR ENERGY SAVINGS

	Energy Use (Quadrillion Btu)				Energy Use (Quadrillion Btu)			
	No Insulation	Baseline (existing)	Savings	% Savings	Baseline (existing)	MEC	Savings	% Savings
Residential - Total Energy All Households	20.41	10.00	10.41	51%	10.00	8.10	1.90	19%
Residential - Single Family Detached Total Energy	14.65	7.18	7.47	51%	7.18	5.82	1.36	19%
Residential - Single Family Detached Heating and Cooling Energy	12.61	5.14	7.47	59%	5.14	3.78	1.36	26%

Table 9 is a detailed summary of attainable energy savings through the insulation of single family attached homes in each of the eleven representative cities and the total energy savings.

TABLE 9

DETAIL SUMMARY OF ATTAINABLE ENERGY SAVINGS

			ANNUAL CONSUMPTION				HEATING SAVINGS		COOLING SAVINGS		TOTAL SAVINGS	
Base Case	Upgrade	City	Heat MMBtu	Cool MMBtu	Other MMBtu	Total MMBtu	Total MMBtu	%	Total MMBtu	%	MMBtu	%
Typical		DETROIT	117.4	1.8	36	155.2						
	MEC	DETROIT	84.2	0.9	36	121.1	33.2	28%	0.9	50%	34.1	22%
None		DETROIT	308.1	6.8	36	350.9						
	Typical	DETROIT	117.4	1.8	36	155.2	190.7	62%	5	74%	195.7	56%
Typical		MINNEAPOLIS	146.7	2.3	36	185						
	MEC	MINNEAPOLIS	103.3	1.2	36	140.5	43.4	30%	1.1	48%	44.5	24%
None		MINNEAPOLIS	400.3	7.6	36	443.9						
	Typical	MINNEAPOLIS	146.7	2.3	36	185	253.6	63%	5.3	70%	258.9	58%
Typical		PROVIDENCE	113	3.5	36	152.5						
	MEC	PROVIDENCE	77.8	1.9	36	115.7	35.2	31%	1.6	46%	36.8	24%
None		PROVIDENCE	311.1	5.4	36	352.5						
	Typical	PROVIDENCE	146.7	2.3	36	185	164.4	53%	3.1	57%	167.5	48%
Typical		KNOXVILLE	92.3	5.0	36	133.3						
	MEC	KNOXVILLE	62.3	3.0	36	101.3	30	33%	2	40%	32	24%
None		KNOXVILLE	222.4	14.9	36	273.3						
	Typical	KNOXVILLE	92.3	5.0	36	133.3	130.1	58%	9.9	66%	140	51%
Typical		ORLANDO	22.7	17.7	36	76.4						
	MEC	ORLANDO	16.6	11.4	36	64	6.1	27%	6.3	36%	12.4	16%
None		ORLANDO	41.9	27.8	36	105.7						
	Typical	ORLANDO	22.7	17.7	36	76.4	19.2	46%	10.1	36%	29.3	28%
Typical		SHREVEPORT	79.3	14.7	36	130						
	MEC	SHREVEPORT	46.5	9.0	36	91.5	32.8	41%	5.7	39%	38.5	30%
None		SHREVEPORT	154.1	25.4	36	215.5						
	Typical	SHREVEPORT	79.3	14.7	36	130	74.8	49%	10.7	42%	85.5	40%
Typical		DENVER	133	2.4	36	171.4						
	MEC	DENVER	81.5	1.2	36	118.7	51.5	39%	1.2	50%	52.7	31%
None		DENVER	323.3	11.7	36	371						
	Typical	DENVER	133	2.4	36	171.4	190.3	59%	9.3	79%	199.6	54%
Typical		FRESNO	86.3	11.8	36	134.1						
	MEC	FRESNO	47.9	6.6	36	90.5	38.4	44%	5.2	44%	43.6	33%
None		FRESNO	159.3	27.3	36	222.6						
	Typical	FRESNO	86.3	11.8	36	134.1	73	46%	15.5	57%	88.5	40%
Typical		LOS ANGELES	61.7	5.6	36	103.3						
	MEC	LOS ANGELES	42.3	3.3	36	81.6	19.4	31%	2.3	41%	21.7	21%
None		LOS ANGELES	111.1	15.4	36	162.5						
	Typical	LOS ANGELES	61.7	5.6	36	103.3	49.4	44%	9.8	64%	59.2	36%
Typical		PHOENIX	48.6	22.1	36	106.7						
	MEC	PHOENIX	33.8	15.7	36	85.5	14.8	30%	6.4	29%	21.2	20%
None		PHOENIX	93.6	50.7	36	180.3						
	Typical	PHOENIX	48.6	22.1	36	106.7	45	48%	28.6	56%	73.6	41%
Typical		SEATTLE	128.4	0.0	36	164.4						
	MEC	SEATTLE	85.5	0.0	36	121.5	42.9	33%	0	0%	42.9	26%
None		SEATTLE	309.1	2.4	36	347.5						
	Typical	SEATTLE	128.4	0.0	36	164.4	180.7	58%	2.4	100%	183.1	53%
TOTAL												
Typical		WT. AVERAGE	86.01	4.88	36.00	126.89						
	MEC	WT. AVERAGE	57.29	2.99	36.00	96.28	28.72	33%	1.89	39%	30.61	24%
None		WT. AVERAGE	212.89	9.44	36.00	258.33						
	Typical	WT. AVERAGE	86.01	4.88	36.00	126.89	126.88	60%	4.56	48%	131.44	51%

COMMERCIAL BUILDINGS

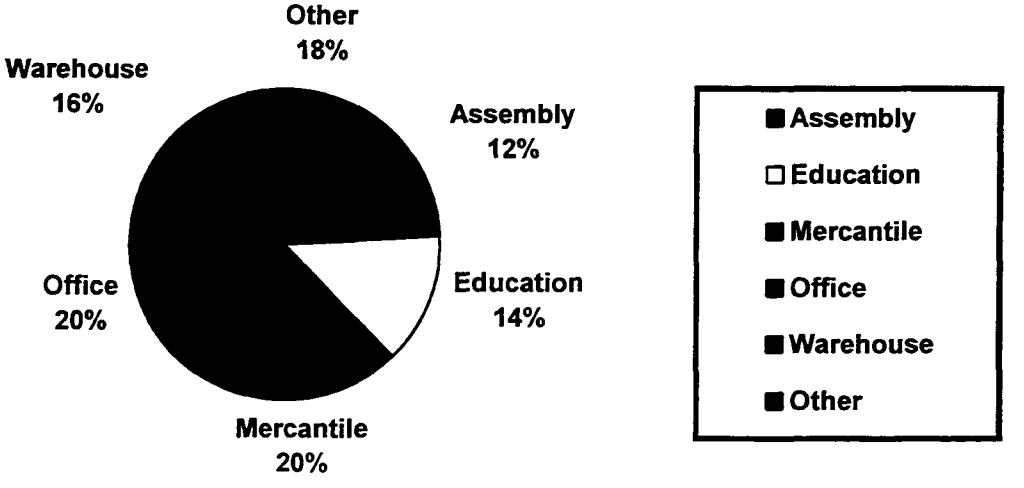
INTRODUCTION

The oil embargoes of the 1970s and fuel price instabilities have increased the nation's and building managers' focus on the critical role of energy use in the commercial sector, and have lead to the increased importance of energy efficiency in this sector as an element of U.S. energy policy. Over the last two decades, energy efficiency has become the focus of the design of new buildings, utility demand side management (DSM) incentive programs and building renovation plans. The thermal performance of commercial building shells has been greatly improved due to market forces, utility DSM incentives, ASHRAE design guidelines and building codes. The results have produced more comfortable commercial buildings, reduced pollution and lower energy usage.

This study estimates the savings due to insulation in commercial buildings existing in the United States today, and assesses the potential savings of bringing the building stock into compliance with ASHRAE 90.1 design guidelines.

METHODOLOGY

In order to determine the energy savings in commercial buildings due to insulation, we used an hourly energy simulation computer program, micro-AXCESS 10.2D, to model representative commercial buildings. Due to the complexity and size of the task to be completed, some generalizations were made. Five types of commercial buildings were modeled to represent the commercial building stock in the continental United States: mercantile (and service), office, warehouse, education, and assembly. These five building types represent 82% of the occupied[12] floor space in existing commercial buildings.[13]



[12] "Vacant" buildings account for 6.5% of total commercial building floor space.

[13] Reference CBECE, p. 19

Assumptions were made about building characteristics such as window thermal performance, occupancy, heating and cooling equipment, domestic hot water equipment, and temperature setpoints. In many cases, program default values were used for building characteristics. Other variables were chosen based upon ASHRAE Standard 90.1, or else a reasonable value was chosen based upon common building and standard engineering practices.

Data Compilation and Processing

The figures representing the thermal insulative values of the walls and roof were determined by calculating the R-value[14] of a typical wall construction with no insulation and the R-value of a typical wall construction with a typical insulation level.[15] The calculated R-values for the roof and wall with and without insulation are shown in Table 10.

TABLE 10
CALCULATED R-VALUES OF ROOFS AND WALLS USED IN ANALYSIS

	No Insulation	Insulation
Wall	3.93	15.76
Roof	4.38	16.88

For the run representing buildings with no insulation, we modeled each of the five building types with the R-values of 3.93 for the wall and 4.38 for the roof. For the existing insulation run, we multiplied each building type R-value by the percentage of those buildings with some type of insulation.[16] We used this R-value as the average insulation level in existing buildings of each type. The assumption is that an average insulation level for all buildings will be very close to the aggregate energy usage of the actual buildings with the varying insulation levels. Table 11 is a summary of insulation values used for the analysis of existing buildings.

TABLE 11
SUMMARY OF ENERGY USAGE BY BUILDING TYPE

	Assembly	Education	Mercantile	Office	Warehouse
% Buildings with Wall Insulation	44.5%	47.8%	43.7%	62.1%	28.3%
Average R-Value of Wall	9.19	9.58	9.10	11.28	7.28
% Buildings with Roof Insulation	69.2%	77.6%	68.3%	82.3%	46.6%
Average R-Value of Roof	13.03	14.08	12.92	14.67	10.21

[14] R-value is a measure of thermal resistance. Its units are (H*sq.ft.*F)/Btu

[15] An Analytical Investigation of Energy End-Use in Commercial Office Buildings, McLain, p. 20

[16] Commercial Buildings Characteristics 1989, p. 196.

Five baseline models were calibrated to closely match the average Btu/square foot consumption for each particular building type.[17]

Five commercial buildings were run in eleven cities: Denver, Detroit, Fresno, Knoxville, Los Angeles, Minneapolis, Orlando, Phoenix, Providence, Seattle, and Shreveport. Each of the cities falls into a particular census region. The four census regions, Midwest, Northeast, South, and West, are shown below in Table 12.[18]

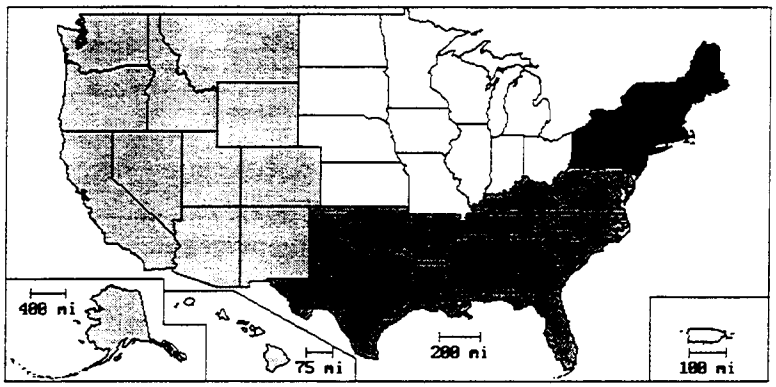


TABLE 12
REPRESENTATIVE CITY LIST

Midwest	Northeast	South	West
Detroit	Providence	Knoxville	Denver
Minneapolis		Orlando	Fresno
		Shreveport	Los Angeles
			Phoenix
			Seattle

Again, the number of cities in each region varies from one to five because the amount of climate variation within each census region differs.

Fuels used in the computer model were natural gas and electricity. The conversion factor for electricity was 3.413 Btu/Watt.[19]

Energy usage calculated by the simulation program in each city was averaged for each census region. We then determined a weighted average of total usage based upon the percent of total energy consumption contributed by each region. This weighted average consumption per square foot for each building type was compared to the federal survey data for consumption per square foot for building type. All five baseline models were within 5% of the survey numbers.

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[17] Commercial Buildings Energy Consumption and Expenditures 1989, p. 19.

[18] Puerto Rico was not included in the analysis.

[19] Automatic conversion in Micro-AXCESS software.

TABLE 13
ENERGY CONSUMPTION BY BUILDING TYPE

	Computer Model Btu/Square Feet	Survey Data Btu/Square Feet	% Difference
Assembly	63,889	63,800	0.1%
Education	89,054	87,200	2.1%
Mercantile	82,148	84,800	-3.1%
Office	106,046	104,200	1.8%
Warehouse	60,314	57,900	4.2%

After the models were calibrated to the Btu/square foot of the survey data, the models were run with no insulation. The runs without insulation were weighted the same way as the average insulation runs. For each building type, we compared the average consumption for the baseline run to the consumption for the no insulation run. A percent savings was calculated from these numbers and was applied to the actual total consumption represented by each building type. Percentages were determined based upon actual total consumption for each of the representative building types, and were then multiplied by the total consumption for all building types to get the representative total consumption per building type.

TABLE 14
CUMULATIVE ENERGY CONSUMPTION BY BUILDING TYPE

	Actual Consumption (Quadrillion Btu)	% Consumption of Total of Five Building Types	Total Representative Consumption (Quadrillion Btu)
Assembly	0.441	11.1%	0.747
Education	0.704	17.8%	1.192
Mercantile	1.048	26.5%	1.774
Office	1.230	31.1%	2.082
Warehouse	0.535	13.5%	0.906
Totals	**3.958**	**100.0%**	**6.700**[20]

RESULTS

The estimated annual energy savings attributable to insulation in commercial buildings is over one and one half quadrillion Btu. By insulating commercial buildings in the United States to current levels, approximately 18 percent of total energy usage has been saved. The commercial building stock of the United States would consume 8.2 quads annually without insulation instead of the 6.7 quads of actual energy usage. Another 0.26 quads could be saved by adopting

[20] Actual total energy consumption - America's Energy Choices, p. 58

insulation standards recommended by the American Society of Heating, Refrigeration and Air Conditioning Engineers. Table 15 shows the estimated division of usage based upon the models.[21]

TABLE 15
SUMMARY OF RESULTS

	Energy Use (Quadrillion Btu)				Energy Use (Quadrillion Btu)			
	No Insulation	Baseline (existing)	Savings	% Savings	Baseline (existing)	ASHRAE	Savings	% Savings
Assembly	.843	.747	.096	11.4%	.747	.732	.015	2.0%
Education	1.571	1.192	.379	24.1%	1.192	1.154	.038	3.2%
Mercantile	2.298	1.774	.524	22.8%	1.774	1.698	.076	4.3%
Office	2.217	2.082	.135	6.1%	2.082	2.077	.005	0.2%
Warehouse	1.281	.906	.375	29.3%	.906	.781	.124	13.7%
Totals	**8.209**	**6.700**	**1.509**	**18.4%**	**6.700**	**6.442**	**.258**	**3.9%**

As evidenced by the above numbers, insulation has saved a significant quantity of energy in commercial buildings. There is even more to be gained by insulating to standards such as ASHRAE 90.1. It may not be technically or economically feasible to bring existing buildings up to the recommended standards, however new buildings have the potential to use the least amount of energy by optimizing the insulation level from their inception.

[21] All energy usage is accounted for in the five categories of building types. Actual usage was proportionately increased to represent total energy usage including other building categories.

INDUSTRIAL SECTOR

INTRODUCTION

One of the most common features of manufacturing facilities, process heating and cooling pipes and vessels, is also considered to contain significant conservation potential. Qualitative assessments suggest that conventional insulation practices leave a great deal of thermal process equipment either under insulated or completely uninsulated. However, recent attempts at survey-based estimation of such thermal losses (discussed later in this report) have been inconclusive. This NAIMA-sponsored study has thus developed a new approach to estimating the energy efficiency potential in industrial pipe and vessel insulation.

This section describes the ECM/Barakat & Chamberlin team's approach to assessing the economic potential for industrial pipe and vessel insulation. Based on thousands of actual industrial energy audits, it develops rigorous, conservative estimates of the energy efficiency potential for insulation in the U.S. manufacturing sector.

METHODOLOGY

The conservation potential was estimated for industrial insulation measures based on Department of Energy (DOE) field audit data for over 3,000 facilities throughout the U.S. Relying upon field audit data offers an independent implementation-oriented perspective on the insulation situation. It provides useful data on the cost of these insulation measures, and addresses that portion of the total conservation potential which can be achieved economically. The results provide additional insight into issues relevant to program development and delivery.

The estimates are based on an extrapolation of the DOE field audit data to the U.S. manufacturing sector as a whole. First, a characterization of the industry-specific energy consumption of the plants audited by DOE was completed. The industry-specific conservation potential, implementation costs, and energy cost savings that could be realized from the insulation measures contained in these audits was summarized. This information was applied to the baseline energy consumption profile of all U.S. manufacturing plants, thereby providing estimates of conservation potential nationwide. Additional analysis on the relative frequency and cost-effectiveness of specific thermal insulation measures was performed to cross calculate the analyses.

The initial step in studies of this type is a review of the existing literature relevant to the topic. To this end, we conducted searches of engineering, manufacturing, and economic journal databases for citations of relevant insulation related publications. While we were able to find a handful of articles addressing the subject, they were mostly "how to" articles for use by plant engineers for specific installations. We also contacted several manufacturing energy-efficiency experts in the engineering department of leading universities, none of whom were able to identify

any useful work in this area. With the exception of earlier NAIMA survey analyses (discussed later in this report), we were unable to find any previous estimates of thermal conservation potential on a large scale.

EADC Program Audit Database

The Energy Analysis and Diagnostics Centers (EADC) Program is administered by the Department of Energy to assist small- and medium-sized manufacturers in improving their overall energy efficiency. The program offers free energy audits of manufacturing plants conducted by engineering faculty and students from 30 major universities throughout the country. The audits contain baseline plant operating characteristics, identify energy conservation opportunities, and estimate the energy savings potential, implementation costs, and energy cost savings for a full range of industrial efficiency improvements, including insulation improvements. The audits recommend only those measures considered to be cost-effective from the plant's perspective based on site-specific implementation and energy costs.

Since EADC audits are conducted at the plant level, energy usage and savings potential are estimated in site Btu. This means that electric energy usage is treated as having an energy value of 3,413 Btu per Kwh. Source Btu analysis, which assigns a primary energy use value of 10,600 Btu per Kwh, is appropriate for macro-level analysis, such as total energy savings at the national level. Therefore, at the end of our analysis we convert electricity savings to source Btu to identify national level impacts. For the main part of the analysis, however (and in all of the tables), electricity usage and savings are reported in site Btu.

The EADC program has maintained a database of its audit findings since 1981. The audit results are classified by the plant Standard Industrial Classification (SIC) code and the measure identification code (DIECO). We extracted insulation measures from the database to develop industry-specific summaries of EADC audit findings for these measures. Our search found that insulation measures were recommended in 1,190 (39%) of the 3,980 plants contained in the version of the database that we used. (The database is continually updated as new audits are completed). Insulation-related measures accounted for 1,689 (8%) of 20,753 efficiency recommendations made in these plants. Table 16 summarizes the number of plants audited and the number of plants with insulation recommendations by SIC code.

Conservation Potential in EADC Plants

Table 17 summarizes the EADC plant baseline, on-site electricity and natural gas consumption and conservation potential due to insulation related measures in those plants where insulation measures were recommended. Recall that these plants account for 30% of the sites in the EADC database. When the energy savings from these plants are projected to the national level, they are diluted proportionately. This means that from the perspective of an individual plant owner, the energy savings potential is more fairly represented by the numbers in Table 17, even though average savings nationwide are lower because many plants contain no economic insulation investments.

From an individual plant owner's perspective, insulation investments identified in EADC audits can save, on average, 0.56% of electricity usage and 2.81% of natural gas and other fuels of total

plant energy. These savings potentials vary by SIC; Lumber and Wood (SIC 24) and Furniture and Fixtures (SIC 25) show savings potentials of 7.5% and 12.75% of total plant gas usage respectively.

TABLE 16
EADC PLANTS WITH INSULATION RECOMMENDATIONS

SIC	Plants in EADC Database	EADC Plants w/Insulation Recommendations	
20	495	215	43.4%
21	0	0	NA
22	191	62	32.5%
23	143	46	32.2%
24	157	43	23.0%
25	94	19	20.2%
26	204	68	33.3%
27	172	39	22.7%
28	170	53	31.2%
29	26	19	73.1%
30	378	158	41.8%
31	22	4	18.2%
32	140	41	29.3%
33	227	63	27.8%
34	513	139	27.1%
35	386	86	22.3%
36	240	65	27.1%
37	152	25	16.4%
38	96	24	25.0%
39	69	18	26.1%
ALL	3,980	1,190	30.5%

While many EADC plants used additional types of fuel, reported insulation impacts were almost entirely on electric and natural gas end-uses. The small amount of impacts on other fuels were included in the natural gas category (on a Btu basis) for convenience. We consider the reported conservation potential in Table 17 to be an "economic" potential since only cost-effective improvements were recommended by the EADC program. Cost-effectiveness in this analysis is calculated from the individual energy user perspective, based on energy costs and utility bills at each site.

Economic potential is typically substantially lower than "technical" potential, which includes all technically feasible improvements regardless of their cost. Table 17 contains potential estimates for all insulation measures combined. A discussion of specific measure impacts and costs follows in a subsequent section of this report. The "Base Energy" reported in Table 17 summarizes the total annual energy consumption (based on site BTU) for all of the EADC plants in each SIC category. The reported savings are the total savings for insulation measures in all the plants in each SIC category. Consequently, plant-specific savings estimates may vary from the average percentage savings figures presented.

U.S. Conservation Potential

We applied the EADC conservation estimates to the U.S. manufacturing sector in order to estimate the nationwide economic potential for insulation measures. The first step was to characterize baseline U.S. manufacturing energy consumption. To do this, we drew upon the DOE's Energy Information Administration periodic surveys of industrial energy use. The most recent study published was for 1991. Table 18 summarizes annual industrial on-site consumption of electricity, natural gas and other fuels by 2-digit SIC category.

We applied the SIC-specific estimates of EADC plants with insulation recommendations from Table 16 and the percentage savings potentials in those plants from Table 17 to the baseline U.S. manufacturing consumption of electricity and natural gas from Table 18. This calculation yielded an estimated economic potential for thermal insulation measures nationwide. Table 19 summarizes baseline energy consumption and the potential estimates by SIC. Note that no conservation potential is indicated for fuels other than electricity and natural gas, since the EADC audits did not identify significant savings for these other types of fuels.

As Table 19 shows, our analysis produced an estimated overall economic conservation potential for insulation measures of 51 trillion Btu or 0.34% of total annual industrial energy consumption. This figure is based on site Btu; if we convert electricity savings to source Btu, the 51 trillion Btu would increase to 61 trillion Btu, or the equivalent of 9.5 million barrels of No. 4 fuel oil per year. Table 19 also shows that the conservation potential for natural gas alone is 0.85%, compared to 0.19% for electricity alone. This is consistent with the fact that electricity is used for process heating far less frequently than natural gas.

The industrial sectors with the greatest potential in terms of total Btu are SIC 29 (petroleum and coal products) at 13 trillion Btu, SIC 33 (primary metals) at 8 trillion Btu, SIC 28 (chemicals) at 7 trillion Btu, and SIC 20 (food and kindred products) at 5 trillion Btu. These four groups account for nearly two-thirds of total conservation potential for insulation.

Strengths and Limitations of the EADC-Based Estimates

The estimates of conservation potential based on the EADC audit data are straightforward. The EADC is the largest source available of field data on industrial energy efficiency potential, and with such a large number of audits covering all major SIC sectors, we have confidence that the EADC data can be used to project economic potential nationwide.

TABLE 17
EADC PLANT INSULATION ECONOMIC ENERGY EFFICIENCY POTENTIAL IN PLANTS WITH INSULATION RECOMMENDATIONS

SIC	Industry	ELECTRICITY			NATURAL GAS		
		Base Energy (MMBtu)	Conservation		Base Energy (MMBtu)	Conservation	
			(MMBtu)	(% of Base)		(MMBtu)	(% of Base)
20	Food and kindred products	3,645,395	7,747	0.21	8,856,615	206,547	2.33%
21	Tobacco products	NA	NA	NA	NA	NA	NA
22	Textile mill products	1,384,311	2,565	0.19	3,295,453	54,416	1.65%
23	Apparel and other textile products	277,701	2,535	0.91	532,035	15,411	2.90%
24	Lumber and wood products	870,760	2,113	0.24	948,062	71,652	7.56%
25	Furniture and fixtures	221,176	2,683	1.26	134,746	17,192	12.76%
26	Paper and allied products	1,337,661	8,038	0.60	4,248,985	116,012	2.73%
27	Printing and publishing	379,440	1,595	0.42	382,998	5,995	1.57%
28	Chemicals and allied products	1,009,030	2,179	0.22	2,143,129	26,752	1.25%
29	Petroleum and coal products	173,952	2,487	1.43	1,888,222	37,968	2.01%
30	Rubber and misc. plastics prod.	2,733,876	39,763	1.45	1,857,548	39,305	2.12%
31	Leather and leather products	32,653	61	0.19	170,390	3,739	2.19%
32	Stone, clay and glass products	1,112,347	138	0.01	4,012,578	138,707	3.46%
33	Primary metal industries	1,352,538	8,749	0.65	2,065,759	73,569	3.56%
34	Fabricated metal products	1,696,880	7,025	0.41	4,115,628	157,585	3.83%
35	Industrial machinery and equip.	1,109,294	5,415	0.49	1,124,495	40,281	3.58%
36	Electronic and other elec. equip.	925,486	6,437	0.70	751,278	19,859	2.64%
37	Transportation equipment	470,342	3,133	0.67	505,096	14,343	2.84%
38	Instruments and related products	212,161	1,374	0.65	181,533	6,056	3.34%
39	Misc. manufacturing industries	120,436	1,852	1.54	137,290	3,065	2.23%
ALL	**ALL INDUSTRIES**	**19,056,437**	**105,889**	**0.56%**	**37,351,839**	**1,048,454**	**2.81%**

TABLE 18
BASELINE U.S. INDUSTRIAL SITE ENERGY CONSUMPTION - 1991[22]

	INDUSTRY	ELECTRICITY		NATURAL GAS		OTHER		TOTAL	
SIC		(Trill. Btu)	%	(Trill. Btu)	%	(Trill. Btu)	%	(Trill. Btu)	%
20	Food and kindred products	169	7.1%	512	9.3%	272	3.8%	953	6.3%
21	Tobacco products	3	0.1%	4	0.1%	17	0.2%	24	0.2
22	Textile mill products	101	4.3%	108	2.0%	64	0.9%	273	1.8%
23	Apparel and other textile products	19	0.8%	19	0.3%	6	0.1%	44	0.3%
24	Lumber and wood products	61	2.6%	41	0.7%	321	4.5%	423	2.8%
25	Furniture and fixtures	17	0.7%	19	0.3%	31	0.4%	67	0.4%
26	Paper and allied products	201	8.5%	548	10.0%	1,723	24.1%	2,472	16.5%
27	Printing and publishing	53	2.2%	48	0.9%	7	0.1%	108	0.7%
28	Chemicals and allied products	440	18.6%	1,669	30.3%	931	13.0%	3,040	20.2%
29	Petroleum and coal products	105	4.4%	838	15.2%	2,044	28.6%	2,987	19.9%
30	Rubber and misc. plastics prod.	116	4.9%	96	1.7%	25	0.3%	237	1.6%
31	Leather and leather products	3	0.1%	5	0.1%	4	0.1%	12	0.1%
32	Stone, clay and glass products	105	4.4%	380	6.9%	409	5.7%	894	6.0%
33	Primary metal industries	499	21.1%	686	12.5%	1,107	15.5%	2,292	15.3%
34	Fabricated metal products	102	4.3%	174	3.2%	29	0.4%	305	2.0%
35	Industrial machinery and equip.	101	4.3%	109	2.0%	25	0.3%	235	1.6%
36	Electronic and other elec. equip.	102	4.3%	79	1.4%	15	0.2%	196	1.3%
37	Transportation equipment	118	5.0%	132	2.4%	83	1.2%	333	2.2%
38	Instruments and related products	42	1.8%	25	0.5%	31	0.4%	98	0.7%
39	Misc. manufacturing industries	14	0.5%	15	0.3%	4	0.1%	31	0.2%
ALL	ALL INDUSTRIES	2,369	100%	5,507	100%	7,148	100%	15,024	100%

[22] 1994 U.S. DOE *Manufacturing Energy Consumption Survey: Consumption of Energy 1991.* Energy Information Administration, Washington, D. C. Draft as of March 30 ,1994

Our work with the database has revealed a number of strengths:

- It is based on actual audit findings in working industrial facilities.
- It encompasses a large sample of geographically distributed plants.
- All fuel types and all but one industry group (SIC 21) are included.
- Standardized auditing and reporting protocols supported data collection.
- Implementation cost and savings data are reported.

Nonetheless, the results of this analysis should be interpreted with caution. While the EADC program has collected an impressive dataset for a wide range of measures in a wide range of plants, use of the EADC data requires a thorough understanding of the program's objectives and operations. The database is not without its limitations, and these must be taken into consideration when evaluating the conservation estimates it provides. Some notable limitations follow:

- The audit recommendations are based on the economic perspectives of individual energy users. Auditors typically recommended the fastest payback measures, based on experience that indicated manufacturers would be less interested in longer payback measures. It was likely that this practice resulted in understatement of the economic potential of insulation measures. More rigorous economic analysis, based on life-cycle costing over the life of the measures, would probably produce a much higher estimate of economic potential.

- Insulation measures were considered along with hundreds of other conservation measures in a limited period of time (typically 1 or 2 days). It is conceivable that audits focusing on insulation measures alone would identify additional opportunities that a more cursory audit may have missed.

- Only small- and medium-sized plants are audited by the EADC program. The application of the data to larger facilities may introduce some error into the analysis. (Pilot studies by EADC suggest that these errors are probably minor.)

This first point, that many cost-effective measures were not included in typical EADC audits, indicates that our analysis is a defensible lower bound for economic potential. Use of more sophisticated methods, such as NAIMA's 3E economic thickness computer model, would likely produce higher estimates of cost-effective savings at a given plant. However, the EADC database does not contain the plant level data needed to provide the inputs to run the 3E model.

The last point relating to plant size may have rather important implications for interpreting potential estimates. It could be argued that insulation potential is concentrated not only in a handful of industries, but also in the largest plants. On the other hand, the largest plants may be the best managed and, consequently, may have the lowest potential for insulation efficiency improvements (in percentage terms). Unfortunately, the EADC data does not support analyses of the effects of plant size on conservation potential, so we were unable to draw definitive conclusions on this issue.

Overall, our review of the EADC data indicates that this analysis has produced a conservative estimate of economic potential. We still believe, however, that this data is perhaps the most realistic basis for projecting economic potential on a national scale.

It is hard to justify rejecting field data in favor of survey or theoretical engineering data. Manufacturing plants are full of critical production processes, inaccessible spaces and hazards that can limit the feasibility of insulation related efficiency measures. These impediments could also add considerable costs to insulation upgrades, well beyond those costs for the purchase and installation of the insulation itself. These factors limit the true achievable potential for efficiency improvements under field conditions.

Comparisons with Previous Estimates

A previous study by Drexel University estimated a conservation potential for insulation of 4.7% of total industrial energy usage.[23] This study estimates a potential of 0.34% of total industrial energy - $1/14^{th}$ of the Drexel result. This is a large difference with considerable policy implications. We believe that both numbers have been estimated reasonably. The difference lies in the methodology employed and in the interpretation of the estimates.

The Drexel study was based on engineering estimates of conservation. Input data for these estimates was collected by means of an extensive telephone survey of 500 manufacturing plants in the major industrial categories. While this approach is advantageous in that it allows for the collection of primary data from many sources in a short period of time, it is subject to certain limitations. Our experience with telephone surveys of industrial plant staff suggests that they have great difficulty accurately quantifying plant characteristics in response to a survey. Short of working out values from facility drawings, their estimates of piping footage, operating temperature, insulation levels, and other factors are probably subject to errors.

As noted above, the cost-effectiveness and general feasibility of insulation retrofits may depend greatly on site-specific factors. The Drexel study presumes that insulation improvements based on their engineering studies are, in general, cost-effective. Given the methods employed, the Drexel estimates seem to be reasonable approximations of *technical* potential but not realistic for *economic* potential.

Technical potential is defined as the energy efficiency gains that could be obtained by installing the most efficient measures that are commercially available in the current time frame. It ignores economic considerations and limits on technical feasibility related to site-specific factors. Economic potential is defined as a subset of technical potential; it is that portion of technical potential that is deemed cost-effective. As discussed earlier, cost-effectiveness can be defined from many perspectives: that of the individual energy user, a utility, all utility ratepayers, or society as a whole.

Our estimate is explicitly based on *economic* potential, and on a conservative definition of economic potential. EADC auditors did not use a classic cost-effectiveness test, in which the

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[23] H.L. Brown and W. Steigelman. 1991 *National Industrial Insulation Survey and Analysis of Energy, Environmental, and Economic Impacts.* Drexel University and RCG/Hagler Bailly for Thermal Insulation Manufactures Association. Philadelphia.

TABLE 19
U.S. INDUSTRIAL CONSERVATION POTENTIAL FOR THERMAL INSULATION MEASURES -1988

SIC	INDUSTRY	BASE CONSUMPTION				ECONOMIC POTENTIAL							
		Electric	Nat. Gas	Other Fuels	All Fuels	Electric		Nat. Gas		Other Fuels *		All Fuels	
		Trill. Btu	Trill. Btu	Trill. Btu	Trill. Btu	Bill. Btu	% of Base	Bill. Btu	% of Base	Bill. Btu	% of Base	Bill. Btu	% of Base
20	Food and kindred	169	512	272	953	156.0	0.09	5,186.3	1.01%	N/A	N/A	5,342	0.56%
21	Tobacco*	3	4	17	24	5.1	0.17	34.1	0.85%	N/A	N/A	39	.016%
22	Textile mill	101	108	64	273	60.7	0.06	578.9	0.54%	N/A	N/A	640	0.23%
23	Apparel and other textile	19	19	6	44	55.8	0.29	177.0	0.93%	N/A	N/A	233	0.53%
24	Lumber and wood	61	41	321	423	34.0	0.06	712.5	1.74%	N/A	N/A	747	0.18%
25	Furniture and fixtures	17	19	31	67	43.5	0.26	490.0	2.58%	N/A	N/A	533	0.80%
26	Paper and allied	201	548	1,723	2,472	402.6	0.20	4,987.0	0.91%	N/A	N/A	5,390	0.22%
27	Printing and publishing	53	48	7	108	50.5	0.10	170.4	0.35%	N/A	N/A	221	0.20%
28	Chemicals and allied	440	1,669	931	3,040	296.2	0.07	6,495.2	0.39%	N/A	N/A	6,791	0.22%
29	Petroleum and coal	105	838	2,044	2,987	1,097.2	1.04	12,313.7	1.47%	N/A	N/A	13,411	0.45%
30	Rubber and plastics	116	96	25	237	705.2	0.61	849.1	0.88%	N/A	N/A	1,554	0.66%
31	Leather	3	5	4	12	1.0	0.03	19.9	0.40%	N/A	N/A	21	0.17%
32	Stone, clay and glass	105	380	409	894	3.8	0.00	3,846.9	1.01%	N/A	N/A	3,851	0.43%
33	Primary metal industries	499	686	1,107	2,292	895.8	0.18	6,780.4	0.99%	N/A	N/A	7,676	0.33%
34	Fabricated metal	102	174	29	305	114.4	0.11	1,805.2	1.04%	N/A	N/A	1,920	0.63%
35	Industrial machinery	101	109	25	235	109.8	0.11	869.9	0.80%	N/A	N/A	980	0.42%
36	Electronic and other electric	102	79	15	196	192.1	0.19	565.6	0.72%	N/A	N/A	758	0.39%
37	Transportation equipment	118	132	83	333	129.3	0.11	616.5	0.47%	N/A	N/A	746	0.22%
38	Instruments and related	42	25	31	98	68.0	0.16	208.5	0.83%	N/A	N/A	277	0.28%
39	Misc. manufacturing	14	15	4	11	48.1	0.40	87.4	0.58%	N/A	N/A	135	0.44%
ALL	ALL INDUSTRIES	2,369	5,507	7,148	15,024	4,469	0.19	46,795	0.85%	N/A	N/A	51,264	0.34%

* Due to audit data limitations, the "ALL INDUSTRIES" conservation potential is used for SIC 21.

* Note that no conservation potential is indicated for fuels other than electricity and natural gas, since the EADC audits did not identify significant savings for these other types of fuels.

present value of savings over the life of the measure is compared to its cost. Rather, they applied "real-world" payback guidelines, which limits their measure recommendations to a subset of the measures that would be theoretically cost-effective. In this respect, the Drexel study and the current analysis are estimating two different things. In other contexts, economic potential has generally been estimated as 25% to 75% of technical potential. Our value is much smaller than that, which suggests that: 1) this estimate is too low, 2) Drexel's estimate is too high, or 3) this estimate is low *and* Drexel's is too high. Given the nature of the data and historic biases in these types of studies, option 3 is most likely. Without additional data, however, it is hard to say how much each number should be adjusted. We recommend considering these estimates as upper and lower bounds on conservation potential with the "true" economic potential lying somewhere in between.

RESULTS

This analysis indicates that a conservative estimate of economic potential is .34% of total industrial energy use, or about 51 trillion Btu site. Most of this savings potential would be in the form of natural gas.

This estimate is based on site Btu; is does not account for losses in energy production and transmission. If we convert the small amount of electricity savings to a source BTU basis, the percentage savings remains the same, but the total savings potential increases to 61 trillion Btu, which is about 9.5 million barrels of oil equivalent per year.

Savings potentials for individual manufacturing plants are likely to be much higher than these national average figures because many plants have little or no insulation. The EADC database contains insulation recommendations for only 30% of all plants audited. At the plants where insulation was recommended, savings potential averaged 2.81% of gas usage, and ranged as high as 13% in some SIC codes. If plant managers used more rigorous tools for calculating economic levels of insulation, such as NAIMA's 3E model, these potential numbers would likely increase.

A previous study by Drexel University, based on self-reported data gathered in a telephone survey, estimated an insulation savings potential of 4.7% of total industrial energy use. However, from reviewing the study, we believe that this estimate is based on *technical* potential, not *economic* potential. In other words, it is based on engineering assumptions of theoretical current conditions and potential improvements, and is not constrained by the same economic criteria and practical feasibility limits represented in our analysis.

The EADC data, on the other hand, has likely understated the economic potential of insulation measures. Auditors recommended only the fastest-payback measures; the average payback in the database was one year. While this reflects a realistic financial guideline employed by many industrial energy managers, it likely leaves out many measures that would pass a classical cost-effectiveness test. In this sense, the EADC data may produce a lower bound for estimates of economic potential.

We thus believe that the "true" economic potential for industrial insulation lies between our EADC-based analysis and the Drexel analysis. This range would then be .34% to 4.7% of total industry energy usage, or the equivalent of 9.5 to 131 million barrels of oil per year. Based on our judgment, we suggest that a realistic estimate would be in the low end of this range.

CONCLUSION

Insulation is a cost-effective, energy saving measure that has saved money for individuals and businesses through lower utility costs and has, in addition, increased comfort levels for all building occupants. Industrial processes have become more efficient through the insulating of pipes, cutting energy losses and decreasing production costs. By avoiding the added energy generation necessary to heat and cool buildings, insulation continues to be a benefit to the environment in the form of reduced pollution emissions.

This study has compared the energy used to manufacture insulation with the energy saved through the installment of insulation. In short, the benefits far outweigh the costs.

The average annual energy used to produce fiber glass and mineral wool insulation is 32.7 trillion Btu.[24] However, insulation saves 11.91 quadrillion Btu, a 34% reduction of total energy usage in the residential and commercial sectors when compared to the total energy used in these sectors when the buildings are not insulated. Insulation is responsible for saving 10.41 quadrillion Btu annually in residential buildings and 1.51 quadrillion Btu in commercial buildings, as shown in Table 20 below.

TABLE 20

	Energy use (Quadrillion Btu)			
	No insulation	Baseline (existing)	Savings	% Savings
Residential	20.41	10.00	10.41	51%
Commercial	8.21	6.70	1.51	18%
Residential & Commercial	28.62	16.70	11.91	42%

The environmental benefits of insulation are clear. The insulation industry emits approximately 4.74 billion pounds of carbon annually in the production of insulation. However, installed insulation is responsible for the annual avoidance of 1,347 billion pounds of carbon in residential buildings and 211 billion pounds of carbon in commercial buildings for a total of 1,558 billion pounds of carbon a year.

Insulation has proven to be a good investment for our society both economically and environmentally, and cost-benefit analyses for individual investments in insulation are often favorable. Insulation has saved us a great deal in the past and will continue to do so in the future. The benefits would become even greater if existing building codes are upgraded and recommended standards become mandatory.

[24] Based on three year average (1991-1993)

For example, if residential buildings were insulated to the Model Energy Code, the decrease in energy usage from existing conditions would save another 1,900 trillion Btu annually. Pollution emissions avoided by the residential sector would increase by 249.2 billion pounds of carbon dioxide. If commercial buildings were insulated to ASHRAE Standard 90.1, the additional energy savings would be 258 trillion Btu annually. The emissions avoided by the commercial sector would increase by 36.12 billion pounds of carbon dioxide. The potential increase in energy savings in the industrial sector is 51.3 trillion Btu annually, and this savings represents an additional emissions avoidance of 8.18 billion pounds of carbon dioxide. By improving insulation standards in all sectors, the total avoided carbon dioxide emissions can increase to 293.5 billion pounds annually.

TABLE 21

	Energy use (Trillion Btu)			
	Baseline (existing)	Potential Reduced Use	Savings	% Savings
Residential	10,000	8,100	1,900	19.0%
Commercial	6,700	6,440	260	3.9%
Industrial	15.02	14.97	0.05	0.34%
Total	16,715	14,555	2,160	12.9%

TABLE 22

	Carbon Dioxide Emissions Reduction Billion pounds	
	Existing	Additional Potential
Residential	1,347	249.2
Commercial	211	36.1
Industrial	Not Calculated	8.2
Total	1,558	293.5

The average energy usage per pound of production for NAIMA members is 10,389 Btu/Lb.[25] However, insulating to existing standards (baseline) saves approximately 95,000 Btu/Lb. in the residential sector and the aggregated average of approximately 120,500 Btu/Lb. in the commercial sector annually.[26] This large range of energy savings per pound of insulation represents a difference in the typical building materials used by the respective sectors.

The ratio of energy savings per year to energy investment in its manufacture has a range of 9.5:1 to 12:1 for the existing stock. These are extremely positive results and conclude that on an aggregate basis, the energy saved and the emissions avoided through the use of insulation are much greater than any energy expended or pollution emitted through its production.

It should be noted that the additional insulation required to bring the existing residential stock up to MEC standards will save approximately 33,750 Btu/Lb. annually. This level of savings is similar to the 28,000 BTU/Lb. calculated for the commercial sector. These conclusions support further investment in building shell insulating material due to the cumulative energy and environmental savings over the useful service life exceeding 30 years.

The ratio of energy savings to energy investment for industrial pipe insulation is dependent on many variables and ranges from 0.5:1 to 45:1[27]. The major variables are operating hours (one shift to all shifts), insulation thickness (one inch for small diameter pipe and one and half inches for larger diameter), and process temperature (200 F to 1,200 F). The greater the operating time and the higher the process temperature the greater the ratio of savings. Pipe insulation is a good investment for industrial process due to economic simple paybacks generally under one year, environmental savings, and workers safety over the useful service life that can exceed 20 years.

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[25] Based on three year average (1991-1993)

[26] Based on 0.63 Lb./ft^3 density insulation residential and 0.74 Lb./ ft^3 density insulation commercial

[27] Industrial Insulation for Systems Operating Above Ambient Temperature, US Dept. of Energy, Energy Efficiency and Renewable Energy Office of Industrial Technologies

APPENDIX A

NAIMA MEMBER ENERGY USAGE AND PRODUCTION SURVEY

NAIMA INSULATION BENEFITS STUDY
MEMBER SURVEY

INTRODUCTION

NAIMA has commissioned this confidential survey as part of a study to quantify the energy and environmental benefits of fiber glass, rock wool, and slag wool insulation. The results of the survey will produce new data, not available from other sources. By calculating the energy used to produce insulation products, the energy that has been saved by insulation in place, and the energy that could potentially be saved through adherence to model building codes and economic standards, the survey will show the true life-cycle benefits of NAIMA members' products.

To make this survey work, NAIMA's consultants will need your help in supplying accurate and complete information on plant energy use, production volume, and distribution. The team of ECM, Inc. and Barakat & Chamberlin, Inc. will be compiling and analyzing information on the energy used in the production of insulation. ***All data supplied by NAIMA members will be held in strictest confidence. All analysis will aggregate data so as to mask proprietary, company-specific or product-specific information.*** Please contact Bill Prindle at Barakat & Chamberlin if you have questions: phone 202/785-8845, fax 202/331-8722.

Please complete a separate survey form for each plant site. If there are multiple utility meters or accounts per site, you may aggregate them on one form or, if you prefer, complete one form per meter/account.

Thank you very much for your cooperation.

Name:

Title:

Company:

Address:

Telephone:

Fax:

Company:

Plant Location:

Energy Type	Energy Usage		
	1991	1992	1993
Electricity (kWh)			
Natural Gas (therms)			
Other:_____ Units:_____			

Product Type	Material Used*	Production (pounds preferred; indicate if other units used)		
		1991	1992	1993
Residential Building Products (Batt, Roll, Fill)				
Commercial Building Products (Batt, Roll, Fill)				
Commercial/Ind'l Board and Pipe Products				
Duct Insulation Products				
Metal Building Products				
Other**:				
Total Plant Production**				

* Key for material used: FG=Fiber Glass, RW=Rock Wool, SW=Slag Wool

** If there are other products not listed in this table, please include them in the total so we can accurately allocate plant energy use to product types.

Company:

Plant Location:

If this plant produces multiple product types, is there a basis for allocating energy use by product type?_____ If so, please explain (use another sheet if necessary):

Distribution: Please supply information as shown below to the extent available. If unavailable, please identify a shipper contact who could supply it: Company:_____;
Name:_____; Phone:_____ Fax: _____

Product Type	Distribution Information				
	Mode			Distribution area*	Avg. miles shipped (if known)**
	Rail	Truck	Intermodal		
Residential Building Products (Batt, Roll, Fill)	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Comm'l. Building Products (Batt, Roll, Fill)	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Comm'l/Ind'l Board and Pipe Products	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Duct Ins. Products	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Metal Building Products	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Other:	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		
Total Plant Production	Vol:	Vol:	Vol:		
	Cost:	Cost:	Cost:		

* Distribution: State whether this plant's products are distributed nationally or regionally (ignoring exports). If regional, please describe the distribution region (ex: Southeastern U.S., states of CA, OR, WA, etc.).

** Include miles for each mode in intermodal split, if known

APPENDIX B

COMMERCIAL BUILDINGS

CHARACTERISTICS

Assembly

The assembly building is based upon a special events facility. It is a one story building with 38,513 square feet of floor space consisting of ballrooms, a lobby, shops, offices, and storage. The ceiling height is an average 11.5' but ranges from 18' in the lobby to 8.5' in the bathrooms. There is a maximum occupancy of 1,396 people in the building. The glass to wall ratio is 28% and the roof and wall construction weights are medium. There are eight exposures represented: N, NE, E, SE, S, SW, W, NW. A miscellaneous plug load of 0.25 W/sq. ft. was used and a lighting load of 1.81 W/sq. ft. was used. A 300,000 Btu gas fired domestic water heater was modeled. Fifteen zones represent the spaces. Rooftop package air conditioners with gas fired furnaces make up the HVAC system. 205 tons of cooling and 270 tons of heating were distributed throughout the zones. The setpoints in the spaces are 75'F for cooling with an 85'F setback and 72'F with a 62'F setback. Infiltration is 0.7 air changes per hour, while the HVAC system provides 15 cfm/person of outside air. The HVAC fans cycle when the building is occupied and turned off when unoccupied. About half the package units have an outdoor dry bulb economizer.

Education

The education building is based upon a middle school. It is a building with 89,728 square feet of floor space consisting of classrooms, offices, a computer room, an auditorium, a gymnasium, locker rooms, a cafeteria, and mechanical rooms. The ceiling height is an average 12'. There is a maximum occupancy of 1,699 people. The glass to wall ratio is 9%, and the roof and wall construction weights are medium. There are four exposures represented: N, E, S, W. A miscellaneous plug load of 0.25 W/sq. ft. was used and a lighting load of 1.50 W/sq. ft. was used. A 200,000 Btu gas fired domestic water heater was modeled. Twenty-one zones represent the spaces. Rooftop package air conditioners with gas fired furnaces make up the HVAC system. 287 tons of cooling and 378 tons of heating are distributed throughout the zones. The setpoints in the spaces are 75'F for cooling with an 85'F setback and 72'F with a 62'F setback. Infiltration is 0.7 air changes per hour, while the HVAC system provides 15 cfm/person of outside air. The HVAC fans cycle during the school season and turn off during the summer. The package units have cooling and heating capabilities as well as preheating and humidification.

Mercantile & Service

The mercantile & service building is based upon a small enclosed multi-store retail space. It is a building with 21,897 square feet of floor space consisting of retail and service areas. The ceiling height is an average 9' with 2' return air ceiling plenum. There is a maximum occupancy of 73 people in the building. The glass to wall ratio is 21%, and the

roof and wall construction weights are medium. There are four exposures represented: N, E, S, W. A miscellaneous plug load of 0.25 W/sq.ft. was used and a lighting load of 2.83 W/sq.ft. was used. A 9,855 Btu gas fired domestic water heater was modeled. Five zones represent the spaces. Rooftop package air conditioners with gas fired furnaces make up the HVAC system. 50 tons of cooling and 55 tons of heating are distributed throughout the zones. The setpoints in the spaces are 75'F for cooling with an 85'F setback and 72'F with a 62'F setback. Infiltration is 0.7 air changes per hour, while the HVAC system provides 20 cfm/person of outside air. The HVAC fans cycle.

Office

The office building is based upon a high rise office building. It has 412,962 square feet of floor space consisting mainly of office space. The ceiling height is an average 9' with a 3' return air ceiling plenum. There is a maximum occupancy of 1500 people in the building. The glass to wall ratio is 39% and the roof and wall construction weights are medium. There are four exposures represented: N, E, S, W. A miscellaneous plug load of 0.75 W/sq.ft. was used and a lighting load of 1.50 W/sq.ft. was used. A 262,500 Btu gas fired domestic water heater and an 80 kW elevator were modeled. Fifteen zones represent the spaces. A central chiller and broiler make up the HVAC system. 1,077 tons of cooling and 8181 tons of heating were distributed throughout the zones. The setpoints in the spaces are 75'F for cooling with an 85'F setback and 72'F with a 62'F setback. Infiltration is 0.7 air changes per hour, while the HVAC system provides 20 cfm/person of outside air. The HVAC fans cycle. The package units have cooling and heating capabilities as well as preheating and reheating.

Warehouse

The warehouse building is a one story warehouse with heating and cooling capabilities. It has 37,636 square feet of floor space consisting mainly of storage area. The ceiling height is an average 12'. There is a maximum occupancy of 18 people in the building. The glass to wall ratio is 11%, and the roof and walls construction weights are medium. There are four exposures represented: N, E, S ,W. A miscellaneous plug load of 0.10 W/sq. ft. was used and a lighting load of 0.48 W/sq. ft. was used. A 4050 BTU gas fired domestic water heater was modeled. Five zones represent the space. Rooftop package units with gas fired furnaces make up the HVAC system. Seventy seven tons of cooling and 138 tons of heating are distributed throughout the zones. The setpoints in the spaces are 75'F for cooling with an 85'F setback and 72'F with 62'F setback. Infiltration is 0.7 air changes per hour, while the HVAC system provides 20 cfm/person of outside air. The HVAC fans cycle.

APPENDIX C

BIBLIOGRAPHY

WORKS CONSULTED

Alliance to Save Energy, American Council for an Energy Efficient Economy, Natural Resources Defense Council and Union of Concerned Scientists. America's Energy Choices: Investing in a Strong Economy and a Clean Environment. Cambridge, Massachusetts: Union of Concerned Scientists, 1991.

American Housing Survey Data Chart, 1989. Housing and Urban Development. American Housing Survey for the United States, 1989.

Belzer, D. B., L. E. Wrench, and T. L. Marsh. End-Use Energy Consumption Estimates for U.S. Commercial Buildings, 1989. Pacific Northwest Laboratory. N.p.: n.p., 1993.

Brown, H.L. and W. Steigelman. National Industrial Insulation Survey and Analysis of Energy, Environmental and Economic Impacts. Drexel University and RCG/Hagler Bailly for Thermal Insulation Manufacturer's Association. Philadelphia, Pennsylvania.

Di Massa, F. V., D. L. Hadley, and M. A. Halverson. Construction Cost Impact Analysis of the U.S. Department of Energy Mandatory Performance Standards for New Federal Commercial and Multi-Family, High-Rise Residential Buildings. Pacific Northwest Laboratory. N.p.: n.p., 1993.

McLain, H. A., J. M. MacDonald, and D. J. Downing. An Analytical Investigation of Energy End-Use in Commercial Buildings. Oak Ridge National Laboratory N.p.: n.p., 1988.

United States. Department of Energy. Energy Information Administration. Commercial Buildings Characteristics 1989. Washington, DC: U.S. Government Printing Office, 1991.

---. ---. Energy Information Administration. Commercial Buildings Energy Consumption and Expenditures 1989. Washington, DC: U.S. Government Printing Office

---. ---. Energy Information Administration. Manufacturing Energy Consumption Survey: Consumption of Energy 1991. Washington, DC: U.S. Government Printing Office, Draft as of March 30, 1994.

Energy Information Administration. Household Energy Consumption and Expenditures 1993. Washington, DC: U.S. Government Printing Office, October 1995.

Energy Information Administration. Household Energy Consumption and Expenditures 1985. Washington, DC: U.S. Government Printing Office, May 1987

Energy and Housing Report. Special Reprint for EEBA Members 1995. Allen L. Frank Associates, Silver Springs, Maryland.

The Freedonia Group, Inc. Insulation Products & Markets. Noreen Curran, 3570 Warrensville Center Road, Suite 201, Cleveland, Ohio

North American Insulation Manufacturers Association. Insulation Facts #45 (Fiber Glass Insulation - Using Recycled Materials Helps Maintain Environmental Balance). NAIMA 44 Canal Center Plaza, Suite 310, Alexandria, Virginia

US Department of Energy. Industrial Insulation for Systems Operating Above Ambient Temperature. Energy Efficiency and Renewable Energy Office of Industrial Technologies, Washington, D.C. September 1995

APPENDIX D

ENERGY AND ENVIRONMENTAL SAVINGS & FACTS ABOUT THE INSULATION INDUSTRY

Appendix D

The following pages summarize the energy savings and environmental benefits of using fiberglass and mineral wool insulation ("insulation," throughout this appendix) for residential, commercial, and industrial applications. Also included are facts about the insulation industry.

The energy savings and carbon dioxide emissions quantities are compared to some common quantities and consumers/producers. The comparisons serve to relate quantities which are difficult to comprehend to quantities which are more easily understood. In other words, the comparisons will answer questions like, "How much is 12 quadrillion Btu? What can be done with that much energy?"

Energy and Environmental Savings

Residential Sector

Insulation currently in place in residential buildings saves:

- 10.41 quadrillion Btus annually.
  - This is equivalent to a 255-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 1.75 trillion miles or 584 million trips across the US from coast to coast.
  - This much energy would generate 36% of America's annual electric consumption, or a continuous 112,000 megawatts, all year long.
  - This is equivalent to 51% of the total annual industrial energy consumption in the US.

- 1.35 trillion pounds of carbon dioxide from being emitted into the atmosphere each year.
  - This much carbon dioxide would fill a spherical balloon over 27,000 feet in diameter (or 91 football fields across).
  - If this insulation were not in place, US carbon dioxide emissions would increase by 156%.
  - Almost 300 million acres of trees would have to be planted to remove this much carbon dioxide from the atmosphere.

- $84 billion per year in heating and cooling costs (about $780 per household)

If insulation in all residential buildings were improved to meet the Model Energy Code:

- an additional 1.9 quadrillion Btus could be saved annually
  - This is equivalent to a 46-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 320 billion miles or 107 million trips across the US from coast to coast.
  - This much energy would generate 7% of America's annual electric consumption, or a continuous 20,500 megawatts, all year long.
  - This is equivalent to 9% of the total annual industrial energy consumption in the US.

- an additional 249.2 billion pounds per year of carbon dioxide emissions could be avoided.
  - This much carbon dioxide would fill a spherical balloon almost 16,000 feet in diameter (or 52 football fields across)

- This would reduce total carbon dioxide emissions in the US residential buildings sector by 29%
- This is equivalent to planting nearly 52 million acres of trees.

Commercial Sector

Insulation currently in place in commercial buildings saves, annually:

- 1.51 quadrillion Btus
  - This is equivalent to a 37-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 254 billion miles or 85 million trips across the US from coast to coast.
  - This much energy would generate 5% of America's annual electric consumption, or a continuous 16,300 megawatts, all year long.
  - In terms of anthracite coal, this would be a pile 1,300 feet high and 2,600 feet across (or 130 stories high by 9 football fields across).

- 211 billion pounds of carbon dioxide from being emitted into the atmosphere.
  - This much carbon dioxide would fill a spherical balloon almost 15,000 feet in diameter (or 49 football fields across).
  - If this insulation were not in place, US annual carbon dioxide emissions would increase by 24%.
  - Over 41 million acres of trees would have to be planted to remove this much carbon dioxide from the atmosphere

If all commercial buildings were insulated to ASHRAE 90.1:

- an additional 258 trillion Btus could be saved annually.
  - This is equivalent to a 6-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 43 billion miles or 14 million trips across the US from coast to coast.
  - This much energy would generate 1% of America's annual electric consumption, or a continuous 2,700 megawatts, all year long.
  - In terms of anthracite coal, this would be a pile 700 feet high and 1,400 feet across (or 70 stories high by 5 football fields across).

- an additional 36.12 billion pounds of carbon dioxide emissions could be avoided each year.
  - This much carbon dioxide would fill a spherical balloon over 8000 feet in diameter (or 27 football fields across).
  - This would reduce total annual carbon dioxide emissions in the US commercial buildings sector by 4%.
  - This is equivalent to planting over 7 million acres of trees.

Industrial Sector

If all industrial buildings were insulated to a cost effective level:

- an additional 51.3 trillion Btus could be saved annually.
  - This is equivalent to driving the average American car 8.6 billion miles or 3 million trips across the US from coast to coast.
  - This much energy would generate 0.2% of America's annual electric consumption, or a continuous 552 megawatts, all year long.

- an additional 8.18 billion pounds of carbon dioxide emissions could be avoided.
  - This much carbon dioxide would fill a spherical balloon almost 5,000 feet in diameter (or 17 football fields across).
  - This would reduce total annual carbon dioxide emissions in the US industrial buildings sector by 1%.
  - This is equivalent to planting nearly 1.5 million acres of trees.

Totals of Residential, Commercial, and Industrial Sectors

Insulation currently in place in residential and commercial buildings saves:

- 12 quadrillion Btus per year.
  - This is equivalent to a 291-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 2 billion miles or 668 million trips across the US from coast to coast.
  - This much energy would generate 42% of America's annual electric consumption, or a continuous 128,000 megawatts, all year long.
  - This much energy would be twice what is needed to operate all of the petroleum refining operations in the US.
  - In terms of anthracite coal, this would be a pile 2,500 feet high and 5,000 feet across (or 250 stories high by 17 football fields across).

- 1.588 trillion pounds per year of carbon dioxide from being emitted into the atmosphere.
  - This much carbon dioxide would fill a spherical balloon almost 29,000 feet in diameter (or 96 football fields across).
  - If this insulation were not in place, US carbon dioxide emissions would increase by 184%.
  - Almost 326 million acres of trees would have to be planted to remove this much carbon dioxide from the atmosphere.

- $84 billion in heating and cooling costs.

If insulation levels were increased (residential to MEC, commercial to ASHRAE 90.1, and industrial to a cost effective level):

- an additional 2.2 quadrillion Btus could be saved each year.
  - This is equivalent to a 54-day supply of gasoline for the entire United States.
  - This is equivalent to driving the average American car 370 billion miles or 123 million trips across the US from coast to coast.
  - This much energy would generate 8% of America's annual electric consumption, or a continuous 23,700 megawatts, all year long.
  - This is equivalent to 11% of the total annual industrial energy use in the US.
  - In terms of anthracite coal, this would be a pile 1,500 feet high and 3,000 feet across (or 150 stories high by 10 football fields across).

- An additional 293.5 billion pounds of carbon dioxide emissions could be avoided each year.
  - This much carbon dioxide would fill a spherical balloon almost 16,000 feet in diameter (or 55 football fields across).
  - This would reduce total carbon dioxide emissions in the US by 34%.
  - This is equivalent to planting over 60 million acres of trees.

About the Insulation Industry

- 3 billion pounds of insulation products are produced per year.

- 10,444 Btu of energy are required to produce one pound of insulation.
    - This is equivalent to the output of a small window air-conditioner in one hour.

- For every Btu consumed in the production of insulation, 12 Btu are saved by the use of insulation.

- For every pound of carbon dioxide emitted in the production of insulation, 330 pounds of carbon dioxide emissions are avoided by the use of insulation.

- The insulation industry's use of recycled material saved 33 million cubic feet of landfill space.
    - This much material would fill a box 320 feet on each side (or a football field, including the end zones on each side).

- The insulation industry has improved energy efficiency substantially over the last decade. Average energy use per pound is 17% lower for 1992 and 1993 than for 1982 and 1983.

- The insulation industry is electric intensive. (i.e. It uses clean fuels, and, therefore, produces less particulate and sulfur emissions than industries using more anthracite coal and oil.)

Reference Sources for Appendix D of
Green and Competitive
The Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products

All energy, carbon dioxide emissions, and economic data are taken from Green and Competitive The Energy, Environmental, and Economic Benefits of Fiberglass and Mineral Wool Insulation Products, a report prepared for the North American Insulation Manufacturers Association in May of 1996

Information pertaining to the following items is taken from the Department of Energy (DOE) Energy Information Agency's (EIA) Internet Home Page http://www.eia.doe.gov /index.html. The path to this data from the homepage is /pub/energy.overview/ monthly.energy/. The data used to calculate the comparisons is taken from tables of raw data which are available at this location.

- Daily gasoline production and supply
- Average efficiency of cars in America
- Annual electricity generation of the US
- Total annual carbon dioxide emissions in the US

Information about annual industrial energy consumption is taken from part 2 of Total Primary Consumption for All purposes, Industry Group and Selected Industries, 1991, a DOE report which is available at the EIA homepage listed above.

The Federal Government's efficiency rating of 10,600 Btu/kWh for electric generating utilities is used to calculate the amount of electricity that could be generated from the energy saved by the use of insulation.

The density of carbon dioxide used to calculate spherical balloon size is 0.123 lb/ft^3, at 14.5 psia and 32 °F.

Data used to calculate "acres of trees" equivalent is taken from EPA's Green Lights Program promotional literature.

Heat content of anthracite coal (used to calculate 'pile of coal" analogy) is taken from Marks' Standard Handbook for Mechanical Engineers, Ninth Ed.

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National Toxicology Program

Fiscal Year 1997 Annual Plan

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service

CONTAINS NO CBI

Review and Approval of Nominations — On January 26, 1996, the NTP Executive Committee reviewed and approved ICCEC recommendations on 11 chemicals nominated to the NTP for extensive toxicological characterization and evaluated by the ICCEC on September 28, 1995. Six of the chemicals— allyl bromide, cellulose insulation, cyanogen chloride, diazoaminobenzene, dimethylaminopropyl chloride HCl, and Stoddard solvent—were recommended by the ICCEC for study, while one, isopropenyl acetate, was recommended for no testing. Four chemicals were reviewed and deferred for further action – chlorate, 1-octene, phenyl glyoxal, and pyridostigmine bromide.

On August 1, 1996, the Executive Committee reviewed and approved ICCEC recommendations on 11 chemicals nominated to the NTP for extensive toxicological characterization and evaluated by the ICCEC on July 15, 1996. Six of the chemicals – chlorate, dibromoacetic acid, carbonyl sulfide, cumene, 1,2-dibromo-2,4-dicyanobutane, and melatonin -- were recommended by the ICCEC for study. Two chemicals were recommended for deferral – *tert*-butyl formate and 2,4,6-tribromophenol. Three chemicals previously approved – 12-O-hexadecanoyl-16-hydroxyphorbol-13-acetate (HHPA), methanol, and 1-octene -- were recommended for no testing. The chemicals, nomination sources, and testing or no testing recommendations are given in Table 4 (Appendix A). (CONTACT PERSON: Dr. E. Zeiger, ETP, NIEHS)

Carbon Disulfide, Carbonyl Sulfide

Chronic toxicity data for carbon disulfide (CS_2) and carbonyl sulfide are needed by regulatory agencies in order to set emission standards in compliance with the Clean Air Act amendment. The Pathology Branch, through the ETP, has supported ongoing mechanism-based studies for CS_2, providing critical data for CS_2 risk assessment. An in-house toxicokinetic study for CS_2 and a 13-week in-house neurotoxicity study (a collaborative effort between NIEHS and EPA scientists, and Duke University Medical Center) are complete. The study characterized progression of CS_2 neurotoxicity and dose-response relationships, identified biomarkers of exposure, examined the molecular mechanism of CS_2 peripheral neuropathy, characterized the morphology of the lesions, and correlated neurobehavioral and electrophysiological studies with biomarkers of exposure. Preliminary mechanistic studies with Duke University Medical Center, based on an epidemiological association in humans between CS_2 exposure and increased atherosclerosis, showed that mice on a high-fat diet developed atherosclerotic lesions faster when exposed to CS_2. Data obtained from the short-term studies defined exposures and endpoints for potential long-term CS_2 studies. This collaborative effort will provide relevant mechanistic data useful in the protection of human health.

During the coming year, the CS_2 atherosclerosis study will be completed and a series of these studies will be submitted for publication. A series of papers on the neurotoxicology studies of CS_2 have been submitted for publication.

Currently, inhalation studies for carbonyl sulfide, a metabolite of carbon disulfide, are under design. The thrust of these studies will be to define certain key aspects of the toxicity of carbonyl sulfide such that the larger carbon disulfide database can be used to complete the dataset needed for risk assessment. (CONTACT PERSON: Dr. R. Sills, ETP, NIEHS)

Chloral Hydrate

A. Metabolism and DNA Binding: The objectives of this study were: 1) to characterize and quantify the metabolites of chloral hydrate formed *in vitro* by mouse, rat, and human liver fractions; 2) to determine the mechanism of metabolic activation of chloral hydrate leading to mutations in *S. typhimurium*; 3) to prepare synthetically carcinogen-modified DNA adducts of chloral hydrate and its metabolites; 4) to determine the principal metabolizing enzymes responsible for metabolic activation and DNA binding of chloral hydrate and its metabolites in mice, rats, and humans; and 5) to study mutagenicity, metabolism, and DNA adduct formation of chloral hydrate and its metabolites in transgenic human lymphoblastoid cells expressing cytochrome P450 (CYP) 2E1 and other CYPs, and to determine which human CYP isozyme might be responsible for metabolic activation of chloral hydrate. This study, which was a part of the comprehensive assessment plan for chloral hydrate, has been completed and a technical report will be available the first quarter of FY 1997 (CONTACT PERSONS: Drs. P. Fu, D. Casciano, and F. Kadlubar, NCTR)

B. Effect of Caloric Intake on Metabolism and Toxicity: The purpose of this project is to determine the effects of caloric intake on the subchronic and chronic toxicity, the expression of certain hepatic proteins, and the metabolism and pharmacokinetics of chloral hydrate in B6C3F1 mice. This study will help address the issue of the effect of body weight on the response of rodents to drugs and xenobiotics and will attempt to determine the degree that drug metabolism in rodents will be altered by caloric manipulation to more closely mimic human metabolism. Control B6C3F1 mice

TABLE 4
Chemicals Reviewed by the NTP Executive Committee on January 26, 1996 and August 1, 1996

Chemical (CAS Number)	Nomination Source	Testing Recommendations (Priority)	Rationale/Remarks
Allyl bromide 106-95-6	NCI	carcinogenicity testing	perform carcinogenicity testing
tert-Butyl formate 762-75-4	EPA; private indiv.	toxicity; carcinogenicity testing	deferred pending exposure information
Carbonyl sulfide 463-68-1	EPA	short and long-term toxicity testing	perform short-term toxicity testing; neurotoxicity, ototoxicity and possible carcinogenicity testing
Cellulose Insulation	Private indiv.	in-depth toxicological evaluation; carcinogenicity testing	perform toxicity and carcinogenicity testing
Chlorate 14866-68-3	EPA	carcinogenicity testing	perform carcinogenicity testing
Cumene 98-82-8	NIEHS	carcinogenicity testing	defer to EPA for consideration under TSCA
Cyanogen chloride (CNCl)	EPA	toxicity; carcinogenicity testing	no testing unless CNCl is stable in stomach, or forms products other than cyanide
Diazoaminobenzene 136-35-6	NIEHS	carcinogenicity and toxicity studies	perform metabolism, short-term toxicity, genetic toxicity, and possible subsequent carcinogenicity studies
Dibromoacetic acid 631-64-1	EPA; AWWRF	short-term toxicity; carcinogenicity testing	perform mechanistic, 90-day, reproductive toxicity, and carcinogenicity studies
1,2-Dibromo-2,4-dicyanobutane 35691-65-7	NIEHS	genetic toxicity, short-term toxicity; possible carcinogenicity testing	perform metabolism study to determine need for carcinogenicity test
Dimethylaminopropyl chloride HCl 5407-04-5	NCI	genetic toxicity testing	test for mutagenicity and carcinogenicity
12-*O*-Hexadecanoyl-16-hydroxyphorbol-13-acetate (HHPA) 53202-98-5	Private indiv.	carcinogenicity and cocarcinogenicity testing	no testing because very limited evidence of human exposure
Isopropenyl acetate 108-22-5	NCI	metabolism; in vitro cytogenetics studies	no testing; anticipated metabolism to acetic acid and acetone

4

SBA Office of Advocacy
U.S. Small Business Administration

The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies

The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies

U.S. Small Business Administration
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FOREWORD

This guide to the Regulatory Flexibility Act has been written to help regulatory staff and federal agency economists understand the purposes of the law, the requirements of the law, and the role of the U.S. Small Business Administration's Office of Advocacy in the regulatory process.

This guide is not the definitive interpretation of the law. Ultimately, each agency must interpret the law within the context of its mission and enabling legislation. Until such time as a body of case law on the Regulatory Flexibility Act develops, the Office of Advocacy offers this guide to help federal agencies determine what is required under its provisions.

In drafting the guide, the Office of Advocacy has endeavored to distinguish between what is required by the Regulatory Flexibility Act and what the Office of Advocacy considers desirable practices and processes under the Act. In this effort, the Office of Advocacy's motivation is to make the process more informative and useful for decision-makers, not more burdensome.

The Office of Advocacy is grateful to the federal agencies that provided detailed comments in response to earlier draft versions of this guide. Their suggestions and recommendations have been incorporated as appropriate.

CONTENTS

ABBREVIATIONS

APA	Administrative Procedure Act
CBO	Characteristics of Business Owners survey
EIS	environmental impact statement
EPA	Environmental Protection Agency
FRFA	final regulatory flexibility analysis
IRFA	initial regulatory flexibility analysis
IRS	Internal Revenue Service
NEPA	National Environmental Policy Act
NOAA	National Oceanographic and Atmospheric Administration
NPRM	Notice of Proposed Rulemaking
OIRA	Office of Information and Regulatory Affairs, OMB
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
RFA	Regulatory Flexibility Act of 1980
RIA	regulatory impact analysis
SBA	U.S. Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act of 1996

INTRODUCTION

The Regulatory Flexibility Act of 1980 (RFA)[1] applies to a wide range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

The major purpose of the RFA is to establish as a principle of regulatory issuance that federal agencies endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of entities subject to the regulation. To achieve this principle, federal agencies are required to:

- solicit and consider flexible regulatory proposals; and
- explain the rationale for their actions to assure that flexible regulatory proposals are given serious consideration.

Some of the reasons Congress passed the RFA include:

- regulations designed for large entities are imposed on small entities without consideration as to whether small entities contribute to the problems that give rise to the need for regulation;
- uniform compliance requirements impose disproportionate burdens on small entities;
- differences in the scale and resources of regulated entities adversely affect competition, innovation, and productivity, and create market-entry barriers;
- alternative regulatory approaches may exist that can minimize the significant impact of rules on small entities without conflicting with the objectives of proposed regulations; and
- regulatory reform is needed in regulation development to solicit the ideas and comments of small entities to examine the impact of proposed and existing rules on those entities.

[1] Pub. L. No. 96-354, 94 Stat. 1164 (codified at 5 U.S.C. § 601).

The RFA does not seek preferential treatment for small entities, require agencies to adopt regulations that impose the least burden on small entities, nor mandate exemptions for small entities. Rather, the RFA encourages agencies to examine public policy issues using an analytical process that identifies, among other things, barriers to small business competitiveness; and seeks a level playing field for small entities, not an unfair advantage.

In essence, the RFA asks agencies to be cognizant of the economic structure of the entities they regulate and the effect their regulations may have on small entities. To this end, the RFA requires agencies to analyze the economic impact of proposed regulations when there is likely to be a significant economic impact on a substantial number of small entities, and to consider regulatory alternatives that will achieve the agency's goal while minimizing the burden on small entities.

Amendments to the Regulatory Flexibility Act

In June 1995, the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) was introduced in the Senate as S. 942 to address some of the deficiencies of the RFA that had been identified in previous oversight hearings — namely, the lack of judicial review of agency actions under the RFA and a history of uneven agency compliance with the act. The bill was amended, passed by Congress, and signed into law by President Clinton on March 29, 1996.[2]

The SBREFA contains several significant amendments, including:

- judicial review of agency compliance with some of the RFA's provisions;
- requirements for more detailed and substantive regulatory flexibility analyses; and
- expanded participation by small entities in the development of rules by

[2] Small Business Regulatory Enforcement Fairness Act of 1996, Pub. L. No. 104-121, 110 Stat. 857 (codified at 5 U.S.C. § 601 et seq. (1996)).

the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA).

OVERVIEW OF THE REGULATORY FLEXBILITY ACT

The RFA imposes three significant regulatory processes on agencies. When there is a significant economic impact on a substantial number of small entities, the RFA requires agencies to:

1. review existing rules periodically;
2. publish a semi-annual agenda of planned regulatory activities; and
3. prepare and publish analyses that examine the economic impacts on small entities of proposed (and final) rules and regulatory alternatives.

The first two processes are described here briefly. The third process, although summarized here, is the primary focus of this guide and is discussed in greater detail in the sections that follow this overview.

Periodic Review of Existing Rules

Section 610 of the RFA requires agencies to review all regulations that have a significant economic impact on a substantial number of small entities within 10 years of their adoption as final rules. The purpose of the review is to assess the impact of existing rules on small entities and to determine whether the rules should be continued without change, amended, or rescinded (consistent with the objectives of applicable statutes) to minimize impacts on small entities.

Each year, agencies must publish in the *Federal Register,* and solicit public comments on, a list of the rules that have a significant economic impact on a substantial number of small entities that will be reviewed under the RFA during the succeeding 12 months. The list must briefly describe each rule and the need and legal basis for the rule. At a minimum, individual rules that have a significant economic impact on a substantial number of small entities are required to be reviewed 10 years after promulgation. Rules promulgated prior to 1980 were required to be reviewed by January 1, 1991. Agency compliance

with section 610 of the RFA is subject to judicial review.

In reviewing rules to minimize impacts on small entities, agencies must consider the following:

- the continued need for the rule;
- the nature of complaints or comments received concerning the rule from the public;
- the complexity of the rule;
- the extent to which the rule overlaps, duplicates, or conflicts with other federal rules and, to the extent feasible, with state and local governmental rules; and
- the length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed since adoption of the rule.

Office of Advocacy Comment: In addition to complying with these statutory requirements, the Office of Advocacy encourages agencies to involve and consult with small entities during the review process to ascertain recent industry developments. Small entities can be a major resource and provide valuable insights into regulatory impacts and improvements needed in agency rules. Federal agencies may also find it helpful to coordinate this review process with the preparation of their semi-annual regulatory agenda.

Semi-Annual Regulatory Agenda

In April and October of each year, federal agencies are required to publish a regulatory agenda in the *Federal Register* listing all rules under development that are expected to have a significant economic impact on a substantial number of small entities.

Significantly, Section 602(c) of the RFA requires agencies to endeavor to either provide direct notification of the agenda to small entities or their representatives inviting comments on each subject area in the agenda, or to

publish the agenda in publications likely to be received by small entities.[3]

Section 602(a)(1)–(3) states that the regulatory agenda must contain the following:

- a brief description of the subject area of any rule the agency expects to propose or promulgate that is likely to have a significant economic impact on a substantial number of small entities;
- a summary of the nature of each such rule for each subject area, the objectives and the legal basis for the rule, and an approximate schedule for completing action on any rule for which an agency has issued a notice of proposed rulemaking (NPRM); and
- the name and telephone number of an agency official knowledgeable about the rule.

(Agencies generally join these agendas with those required by Executive. Order 12,866.)

Analyses of Proposed and Final Rules: Initial Regulatory Flexibility Analyses

If an agency determines that there will be a significant economic impact on a substantial number of small entities (including small businesses, small organizations and, small government jurisdictions as defined in section 601(3)–(5)), the agency must prepare an initial regulatory flexibility analysis (IRFA).[4]

Office of Advocacy Comment: In order to make a determination as to whether there is likely to be a significant economic impact on a substantial number of small entities, it is necessary — as a practical reality — to first perform a preliminary informal analysis to determine whether there is any impact.

The IRFA must: (1) describe the impact of the proposed rule on small

[3] The rationale behind this requirement is that small businesses typically do not have access to the *Federal Register*.

[4] 5 U.S.C. §§ 603 and 605.

entities, and (2) describe any alternatives to the proposed rule that would minimize the impact while accomplishing the stated objectives of the applicable statutes.

Small Business Definitions

In developing a rule affecting "small businesses," agencies must: use the definition of small business that is contained in the Small Business Administration's small business size standard regulations,[5] promulgated by the SBA under the Small Business Act; consult with the SBA's Office of Advocacy on an alternate size standard; and publish the standard for public comment. If, however, the statute on which a rule is based provides a different definition of small business, then an agency may use that definition without consultation with the Office of Advocacy.

For further guidance and possible additional requirements, agencies should refer to the SBA's size regulations, 13 CFR § 121.902(b)(4), promulgated under the Small Business Act. The regulation reads:

"Where the agency head is developing a size standard for the sole purpose of performing a Regulatory Flexibility Analysis pursuant to the Regulatory Flexibility Act, the department or agency may, *after consultation with the SBA Office of Advocacy,* establish a size standard different from SBA's which is more appropriate for such analysis." [Emphasis added.]

Publication of IRFA for Public Comment

Section 603(a) states that either the full text or a summary of the IRFA must be placed in the *Federal Register* for public comment when the rule is proposed.[6] In addition, when there will be a significant economic impact on a substantial

[5] 13 C.F.R. § 121.201 (1996).

[6] This requirement also applies to interpretive rules from the Internal Revenue Service (IRS) when the interpretive rule contains a collection of information requirement. See 5 U.S.C. § 603(a).

number of small entities (hence, when an IRFA is required), section 609(a)–(b) requires the head of the agency to ensure that proactive steps are taken to engage participation by small entities in the review of the rule during the early stages of the rulemaking.

Final Regulatory Flexibility Analyses

Under section 604, a final regulatory flexibility analysis (FRFA) must be completed for all final rules with a significant impact on a substantial number of small entities. The purpose of the FRFA is to address the concerns raised in the public comments in response to the IRFA, describe the impact of the rule on small entities, and explain the steps the agency has taken to minimize the impact of the rule on small entities, including reasons for adopting or rejecting each of the regulatory alternatives discussed in the IRFA.

Certification Option: "No Significant Impact"

However, if, after an analysis for a proposed or final rule, an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) provides that the head of the agency may so certify. The certification must include a statement providing the *factual* basis for this determination, and the certification may be published in the *Federal Register* at the time of the proposed rule or the final rule for public comment.[7]

Office of Advocacy Comment: The reasoning for the certification should be clear. Agencies should avoid mere boilerplate assertions in their certifications and provide justification with sufficient clarity to ensure that the public is effectively informed as to the agency's rationale for the certification.

[7] There are circumstances where it may be appropriate to publish an IRFA for the proposed rule, and based on the comments received, publish a certification for the first time in the final rule.

Agency attention to every aspect of the RFA is important because agency compliance with provisions addressing periodic review of regulations, outreach to small entities, small entity definitions, "no impact" certifications, and final regulatory flexibility analyses are subject to judicial review under the SBREFA amendments to the RFA.[8]

The following sections of this guide explain more fully the analytical requirements of the RFA and provide step-by-step guidance on complying with the law. Throughout the guide, the Office of Advocacy has attempted to provide suggestions to address ambiguities in the law as well as discuss the practical implications of the law. The charts in Appendix E, "Overview of the RFA Analysis Development Process," may be particularly helpful in visualizing the entire process.

The RFA establishes an analytical process, not merely procedural steps, for analyzing the impact of regulations on small entities. Boilerplate analyses or certifications will not satisfy the law. The law anticipates that something substantive will emerge from the process to ensure that public policy is enhanced.

[8] Pub. L. No. 104-121, 110 Stat. 864 (codified at 5 U.S.C. § 601 et seq. (1996)).

THE ROLE OF THE SBA'S OFFICE OF ADVOCACY IN THE REGULATORY PROCESS

The Office of Advocacy in the U.S. Small Business Administration was established by Congress in 1976 to be an independent voice for small business in matters of government policy and regulation. The Office is headed by a chief counsel who is appointed from the private sector by the President and confirmed by the Senate. (The Office of Advocacy's mission, structure, and activities are described in greater detail in Appendix B.)

One of the more significant mandates of the Office of Advocacy is to monitor the contribution of small business to competition and the economy. In this connection, the Office publishes significant economic reports on trends and characteristics of small business.

The Office of Advocacy is also charged with measuring the cost of regulations on small business. The Office has published several major reports on this issue and its staff uses economic data to evaluate and develop comments for the public record on the impact of proposed regulations on small business and other small entities.

When Congress enacted the Regulatory Flexibility Act in 1980, it mandated that the Office of Advocacy monitor agency compliance with the law and report annually to the President and to Congress. From a historical perspective, the reports published under that directive show different levels of compliance, as well as patterns of non-compliance, with the law.[9] This has occurred despite the fact that the Office of Advocacy has submitted numerous formal comments over the years on a wide range of regulatory proposals, highlighting deficiencies in agency compliance with the RFA. This non-compliance resulted in large part

[9] See U.S. Small Business Administration, Office of Advocacy, *Annual Report of the Chief Counsel for Advocacy on Implementation of the Regulatory Flexibility Act* (Washington, D.C.: U.S. Small Business Administration, 1983–1997).

from the fact that the RFA provided no enforcement mechanism to force agency compliance.

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 amended the RFA significantly, the major change being a provision that allows small entities appealing final regulations to seek judicial review of agency compliance with certain provisions of the RFA. SBREFA also strengthened the *amicus curiae* (friend of the court) authority of the SBA's chief counsel for advocacy by allowing him to address (1) agency compliance with the RFA; (2) the adequacy of an agency's rulemaking record with respect to small entities; and (3) the effect of the rule on small entities.[10] The chief counsel's *amicus curiae* authority, therefore, extends beyond RFA issues.

[10] Pub. L. No. 104-121, § 243(b)(2), 110 Stat. 866 (codified as amended at 5 U.S.C. § 612(b)).

ANALYZING PROPOSED RULES I: FIRST STEPS

The Regulatory Flexibility Act requires agencies to consider the impact of their rules on small entities and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities. Although the RFA does not specifically require agencies to preserve competition in the marketplace, inherent in the RFA is a desire to remove barriers to competition and encourage agencies to consider ways of tailoring regulations to the size of the regulated entities.[11]

The RFA does not require that agencies necessarily minimize a rule's impact on small entities if there are significant legal, policy, factual, or other reasons for the rule's having such an impact. The RFA requires only that agencies determine, to the extent feasible, the rule's economic impact on small entities, explore regulatory alternatives for reducing any significant economic impact on a substantial number of such entities, and explain the reasons for their ultimate regulatory choices.

Office of Advocacy Comment: The RFA should promote creative thinking about regulatory alternatives that achieve statutory purposes, while still minimizing the impacts on small entities. Regulatory flexibility analyses built into the regulatory development process at the earliest stages will help agency decision-makers achieve regulatory goals with realistic, cost-effective, and less burdensome regulations.

Some of the relevant questions to consider in the first steps of an RFA analysis are:

- Does the RFA apply?
- What is the definition of a small entity?
- What is the preliminary economic impact assessment based on the size and type of entities affected and the likely overall cost?

[11] See, generally, FINDINGS AND PURPOSES, SEC. 2(a)–(b).

- What attempts outreach to small entities have been made to assess or verify potential impacts?
- Whether or not to certify — Does the rule have a significant economic impact on a substantial number of small entities?
- If there is a certification, have the justifications for the certification been explained sufficiently?

The following sections will attempt to define these terms as well as provide guidance on answers to these questions.

Office of Advocacy Comment: By far, the Office of Advocacy receives the most inquiries concerning the provisions of the RFA that deal with the terms "small entity"; "significant economic impact"; and "substantial number."

Does the RFA Apply?

Relevance of the Administrative Procedure Act. The RFA applies to any rule subject to notice and comment rulemaking under section 553(b) of the Administrative Procedure Act (APA), or any other law, including any rule of general applicability governing federal grants to state and local governments, for which agency procedures provide opportunity for notice and comment. For instance, some agencies, such as the Rural Utilities Service, have their own administrative rules that require notice and comment even though the agency's rules may be exempt from the APA.

The APA and RFA Exemptions. Rules are exempt from APA requirements, and therefore from the RFA requirements, when any of the following is involved: (1) a military or foreign affairs function of the United States or (2) a matter relating to agency management or personnel or to public property, loans, grants, benefits, or contracts.[12] In addition, the RFA does not apply to rules of particular applicability relating to rates, wages, corporate or financial structures or reorganizations thereof, prices, facilities, appliances, services or

[12] 5 U.S.C. § 553(a).

allowances.[13]

RFA Now Applies to Certain IRS Rules. The SBREFA amended the RFA to bring certain interpretative rulemakings of the Internal Revenue Service within coverage of the RFA. The law now applies to those IRS rules published in the *Federal Register* that impose a "collection of information" (paperwork) requirement on small entities.[14]

What Is the Definition of a "Small Entity"?

Defining Small Entities. The definition of "small entity" is important because it is the starting point for determining the degree of impact a regulation will have. The size of the business, government unit, or not-for-profit organization being regulated has a bearing on the ability of that entity to comply with federal regulations. For example, the costs of complying with a particular regulation — measured in staff time, recordkeeping, outside expertise, and other direct compliance costs — might be roughly the same for a company with sales of $10 million as for a company with sales of $1 million. In a larger business, however, the costs of compliance can be spread over a larger volume of production. For small entities, a burdensome regulation could affect the ability to set competitive prices, to devise innovations, or even to make a profit.[15] In some cases, a small business may be unable to stay in business due to the cost of a regulation. Simply stated, fixed costs have a greater impact on small entities because small entities have fewer options for recovering those costs. Thus, if an agency does not have access to a good profile of the industry or industries to be regulated or does not know the number and type of entities that would be affected by a rule, any determination regarding impact will not be credible.

[13] 5 U.S.C. § 601(2).

[14] 5 U.S.C. §§ 601(b)(1)(a), 603.

[15] See Todd A. Morrison, *Economies of Scale in Regulatory Compliance: Evidence of the Differential Impacts of Regulation by Firm Size,* report no. PB85-178861, prepared by Jack Faucett Associates, Inc., for the U.S. Small Business Administration, Office of Advocacy (Springfield, Va.: National Technical Information Service, 1985).

(Appendix C contains data sources that may be helpful in drawing distinctions between large and small entities.)

Three types of small entities are defined in the RFA:

"Small Business." Section 601(3) of the RFA defines a "small business" as having the same meaning as "small business concern" under section 3 of the Small Business Act. This includes any firm that is "independently owned and operated" and is "not dominant in its field of operation."[16] As previously discussed, the SBA has developed specific regulations concerning size standards and related issues.[17] To the extent that an agency believes that SBA's definition of "small business" is not appropriate for purposes of this chapter, there are provisions that allow agencies to develop their own definition or definitions of "small business" appropriate to the activities of the agency. To establish a different definition of "small business" for a rule, agencies must (1) consult with the Office of Advocacy; (2) provide an opportunity for public comment on the definition in the proposed rule; and (3) publish the final definition(s) in the *Federal Register* with the final rule.

"Small Organization." Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field (for example, private hospitals and educational institutions). Agencies may develop one or more alternative definitions of "small organization" for purposes of this chapter provided that they: (1) give an opportunity for public comment and (2) publish the final definition in the *Federal Register*.

"Small Governmental Jurisdiction." Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Agencies may develop one or more alternative definitions for this term provided that they: (1) give opportunity for public comment, (2) base defini-

[16] 15 U.S.C. § 632.

[17] 13 C.F.R. § 121.201 (1996).

tions on factors such as low population density and limited revenues, and (3) publish final definitions in the *Federal Register*.

Agency decisions under section 601 of the Act are subject to judicial review. Thus, any agency size standard determination that differs from the SBA's size standard is subject to review.[18]

Office of Advocacy Comment: As noted on page 7 of this guide, there may be additional requirements for selecting an alternate definition of size for small businesses (but not small organizations or small governmental jurisdictions) under the Small Business Act, 15 U.S.C. § 632(a)(2)(C) and SBA regulations, 13 C.F.R. § 121.902 (1997)).

What Is the Preliminary Assessment as to the Economic Impact on Small Entities?

Determining a rule's impact on small entities is an important part of the rulemaking process. The RFA requires agencies to conduct sufficient analyses to measure and consider the regulatory impacts of the rule and whether there will be a significant economic impact on a substantial number of small entities. Unlike Executive Order 12,866, which defines a "significant rule" as one with an impact on the economy of $100 million or more, there is no such threshold in the RFA for defining "significant economic impact on a substantial number of small entities." No definition could, or arguably should, be devised to apply to all rules given the dynamics of the economy and changes that are constantly occurring in the structure of small-entity sectors.

Every rule is different. The level, scope, and complexity of analysis may vary significantly depending on the characteristics and composition of the industry or small-entity sectors to be regulated. This is why it is important that agencies make every effort to conduct a sufficient and meaningful analysis when promulgating rules.

Office of Advocacy Comment: The preparation of the required analysis calls for due diligence,

[18] 5 U.S.C. § 611(a).

knowledge of the regulated small entity community, sound economic and technical analysis, and good professional judgment. It seems reasonable to conclude from the overall objectives of the RFA that the first steps in the analytical process might include understanding the nature and economics of the industry/entities being regulated, and identifying how much each sector is contributing to the problem the agency is trying to address and mitigate.

Definition of "Significant" and "Substantial"

Congress provided no specific definitions for the terms "significant" and "substantial." In the absence of statutory specificity, the process of defining these terms should trigger critical thinking among agency regulatory personnel. Thus, what is "significant" or "substantial" will vary depending on the underlying enabling legislation, the problem being addressed, the rule being promulgated, and the preliminary assessment of the rule's impact.

Some agencies have begun to develop criteria for determining whether a particular economic impact is significant and whether the proposed action will affect a substantial number of small entities.[19] For example, the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce considers a substantial number of small entities to be more than 20 percent of the industry. NOAA defines a significant effect as a regulation that is likely to (1) reduce gross revenues by more than 5 percent; (2) increase total costs of production by more than 5 percent; (3) cause small entities to incur compliance costs 10 percent greater than compliance costs of large entities; or (4) cause 2 percent of small entities to cease business operations.

In another example, the Department of Health and Human Services has determined that a rule is not significant if it would not reduce revenues or raise costs of any class of affected entities by more than 3 to 5 percent within five years.

Office of Advocacy Comment: As discussed in the second example, some agencies like to use a simple economic rule and apply a percentage-of-revenues criterion; however, general

[19] These criteria are for illustrative purposes only and are not endorsed by the Office of Advocacy.

application of such a rule may be problematic. A 2-percent reduction in revenues in one small commercial or industrial category would be significant if their profits are only 3 percent of revenues. Moreover, over 60 percent of small businesses do not claim a profit and do not pay taxes; therefore, an agency would not be able to apply a profit-based criterion to these firms.

The Office of Advocacy welcomes agency initiatives to provide a framework for their analytical processes. However, it takes no position on the validity of the criteria except in the context of how the criteria are used to measure impact and to develop a particular rule.

The absence of a particularized definition of either "significant" or "substantial" does not mean that Congress left the terms completely ambiguous or open to unreasonable interpretations. Courts have reviewed statutes that are analogous to the RFA in purpose and ruled on certain definitions. Thus, the Office of Advocacy relies on two sources for general guidance on defining these terms: (1) legislative history and (2) court decisions under analogous laws.

Office of Advocacy Comment: The Office of Advocacy also relies on these sources for discussion later in this guide to conclude that "impact" under the RFA means both adverse and beneficial impacts. Admittedly, throughout this guide, references are made to "adverse" impacts and efforts to "mitigate" impacts. This, after all, is the primary concern of the law. Legislative history, however, makes it clear that Congress intended that regulatory flexibility analyses also address "beneficial" impacts.

Legislative History: "Substantial Number"

To affect a substantial number, a proposed regulation must certainly impact at least one small entity. At the other end of the range, legislative history would not require agencies "to find that an overwhelming percentage [(more than half)] of small [entities] would be affected" before requiring an IRFA.[20] Legislative history also says that the term "substantial" is intended to mean a substantial number of entities within a particular economic or other activity.[21] The intent of the RFA, therefore, was not to require that agencies find that a

[20] 126 CONG. REC. S10941 and 10942 (1980)(SECTION-BY-SECTION ANALYSIS OF THE REGULATORY FLEXIBILITY ACT).

[21] 126 CONG. REC. at S10938.

large number of the entire universe of small entities would be affected by a rule.

Office of Advocacy Comment: The Office of Advocacy recognizes that the quantification of "substantial" may be industry- or rule-specific. Nevertheless, it is the opinion of the Office of Advocacy that any rule that impacts "more than just a few" small businesses within an industry warrants the application of the RFA's analytical processes, at least initially. In other words, to make an initial threshold determination of impact, an agency should utilize the "more than just a few" criteria before making a final determination regarding the need for an initial regulatory flexibility analysis.

Legislative History: "Significant Economic Impact"

With regard to the term "significant economic impact," Congress said:

"the term 'significant economic impact' is, of necessity, not an exact standard. Because of the diversity of both the community of small entities and of rules themselves, any more precise definition is virtually impossible and may be counterproductive. Any more specific definition would require preliminary work to determine whether the regulatory analysis must be prepared."[22]

Congress also stated that,

"Agencies should not give a narrow reading to what constitutes a "significant economic impact," and that "a determination of significant economic effect is not limited to easily quantifiable costs." [23]

Congress has identified several examples of "significant impact": a rule that provides a strong disincentive to seek capital[24]; 175 staff hours per year for recordkeeping[25]; impacts greater than the $500 fine imposed for non-compliance[26]; new capital requirements beyond the reach of the entity[27]; any

[22] 126 CONG. REC. at S10942 (1980).

[23] 126 CONG. REC. at S10940 (1980).

[24] 126 CONG. REC. at S10938 (1980).

[25] *Idem.*

[26] 126 CONG. REC. at H24578 (1980).

[27] 126 CONG. REC. at H24593 (1980).

impact less cost-efficient than another reasonable regulatory alternative[28]; any impact where the adverse cost impact is greater than the value of the regulatory good. None of these standards establish a ceiling below which impacts are not significant. Other, more specific examples are contained in the House of Representatives report on the RFA.[29]

Legislative History and Case Law: Adverse and Beneficial Impacts

Congress apparently considered the term "significant" neutral with respect to whether the impact benefits or harms small business, therefore suggesting the need to consider both in an analysis. The legislative history on the RFA provides explicit insights into congressional intent with respect to the issue of beneficial impacts:

"Agencies may undertake initiatives which would directly benefit such small entities. Thus, the term 'significant economic impact' is neutral with respect to whether such impact is beneficial or adverse. The statute is designed not only to avoid harm to small entities but also to promote the growth and well-being of such entities."[30]

Moreover, early drafts of the RFA used the term "substantial adverse" impact, but the final bill used only the term "substantial impact."[31]

Research thus far by the Office of Advocacy has not produced any RFA case law that provides guidance on the "adverse vs. beneficial" question. However, courts have recently applied definitions for "significant impact" to

[28] 126 CONG. REC. at H24595.

[29] "A gas station owner spent 600 hours last year filling out just his federal reporting forms. An Idaho businessman paid a $500 fine rather than fill out a federal form which was 63 feet long. A New Hampshire radio station paid $26.23 in postage to mail its license renewal back to Washington. A dairy plant licensed by 250 local governments, 3 states, and 20 agencies had 47 inspections in 1 month. A butcher had one federal agency tell him to put a grated floor in his shop one month and then the next month was told by another federal agency he could not have a grated floor. A company was forced out of the toy business because one of its main products was inadvertently placed on a federal ban list. An Oregon company with three small shops received federal forms weighing 45 pounds." 126 CONG. REC. H8467 (1980).

[30] 126 CONG. REC. H8468 (September 8, 1980) (discussion of issues from House consideration of the RFA).

[31] See S.2147, 96th Congress, 1st Sess. (1979).

other statutes. For example, in a case involving the National Environmental Policy Act (NEPA), *Friends of Fiery Gizzard v. Farmers Home Administration,*[32] the court held that a full environmental impact statement (EIS) does not need to be prepared if the only impact of the project will be beneficial. However, the court acknowledged that when both negative and beneficial effects are present an EIS must be prepared even if the agency feels that the beneficial effects outweigh the negative ones.[33] (This case does not say that beneficial impacts should not be considered for the preliminary assessment, nor does it say that beneficial impacts are never a factor.) Earlier cases interpreting NEPA held that beneficial impacts should be a consideration in the rulemaking process.[34]

Office of Advocacy Comment: Several agencies have taken issue with the Office of Advocacy's interpretation of significant economic impact. However, the Office believes that its interpretation is consistent with the legislative history and overall purposes of the RFA. The Office of Advocacy does not dispute that the RFA requires agencies to "minimize the significant economic impact" (5 U.S.C. § 601, note). However, the Office of Advocacy's interpretation does not necessarily mean that agencies should minimize beneficial impacts — that certainly would be contrary to the purposes of the RFA. Instead, the Office believes that agencies can minimize the adverse impact by including beneficial impacts in the analysis. It is possible to do this with minimal effort and without necessarily triggering the procedural requirements of the RFA, namely, the requirements for an IRFA. Moreover, analyzing beneficial impacts lends credibility to the alternatives selected by the agency.

Certification of "No Significant Impact"

The RFA permits the head of a federal agency head to forego the preparation of an initial regulatory flexibility analysis (IRFA) upon a written certification that a rule will not have a "significant economic impact on a substantial number of

[32] 61 F.3d 501 (6th Cir. 1995).

[33] Ibid., at 505.

[34] See *Hiram Clarke Civic Club v. Lynn*, 476 F.2d 421, 426-27 (5th Cir. 1973) (considering only negative impacts "raises serious questions about the adequacy of the investigatory basis underlying the HUD decision not to file an EIS."); *Environmental Defense Fund v. Marsh*, 651 F.2d 983, 993 (5th Cir. 1981) ("[A] beneficial impact must nevertheless be discussed in an EIS, so long as it's significant. NEPA is concerned with all significant environmental effects, not merely adverse ones.")

small entities."[35] If an agency opts for this determination, the certification must include a factual basis for the decision.[36] Congress intended that the "factual basis" should provide a sufficient record upon which a court may review an agency's actions.[37]

Finally, if an agency can certify that a rule will not have a significant impact on a substantial number of small entities, no further analysis is needed under the RFA, other than the "factual basis" for the certification.

Office of Advocacy Comment: The Office of Advocacy interprets the "factual basis" requirement to mean that, at a minimum, a certification should contain a description of the affected entities and the impacts that clearly justify the "no impact" certification. The agency's reasoning and assumptions underlying its certification should be explicit in order to elicit public comment and thus assure that the rule was not certified in error.

Agency certifications are subject to judicial review. Thus, certifications of "no significant economic impact on a substantial number of small entities" have major legal implications for agencies. Consequently, boilerplate certifications need to be avoided. The "more than just a few" standard for determining if a rule will impact a "substantial number of small entities" is a rigorous test for agencies to follow, but when the minimum or maximum cut-offs are unknown, the Office of Advocacy urges the safest course. In other words, if an agency has miscalculated the impacts of a regulation because its standard for determining "substantial number" was set too high, the certification may give rise to avoidable court challenges.

Also, if an agency is uncertain of the impact, it is recommended that the agency err on the side of caution and perform an IRFA with the available data and information, and solicit comments from small entities regarding impact. Then, if appropriate, the agency can certify the final rule.

An agency should consider establishing support for any certification with written documentation from small entities affected by the rulemaking. Although such written documentation from small entities is not required, efforts to obtain such documentation will help ensure that agencies are reaching the proper conclusion and conducting appropriate outreach to small entities. (See discussion of outreach to small entities on pages 24 to 25.)

[35] 5 U.S.C. § 605(b).

[36] Prior to the SBREFA amendments in 1996, the RFA only used to require that certifications be supported by a "succinct statement explaining the reasons for the certification." The amended version of the RFA now requires that certifications be supported by a "statement of factual basis." It is fairly clear that in amending the RFA, Congress intended that agencies should do more that provide boilerplate or unsubstantiated statement(s) to support their RFA certifications.

[37] See 142 CONG. REC. E574, April 19, 1996.

Certification Using Other Definitions of "Small Business"

Certification of a rule that regulates business (as opposed to small organizations or small governmental jurisdictions) necessarily implies that the agency is using the SBA's definition of a small business, unless the rulemaking agency states otherwise.

If an agency intends to rely on a small business definition for its certification that differs from the definition detailed in section 601(3) of the RFA as amended, it must first consult with the Office of Advocacy on an appropriate definition/size standard. In addition, the preamble to the rule must notify the public that it is using a different standard in order to provide an opportunity for comment, and the agency must publish its proposed definition(s) in the *Federal Register.*

Office of Advocacy Comment: If an agency certifies a rule, the Office of Advocacy suggests that the agency insert the following language into the preamble to the rule:

"Pursuant to section 605(b) of the Regulatory Flexibility Act, 5 U.S.C. § 605(b), the head of [*name of agency or department*] certifies that this rule will not have a significant economic impact on a substantial number of small entities. [*Explain the factual basis for the certification.*]

"In making this determination, the agency [used/did not use] the SBA definition of small business, found at 13 C.F.R. § 121.201: [*Quote the SBA standard.*]"

"Instead, after consultation with the Office of Advocacy and after receiving the prior approval of the SBA Administrator, the small business definition used by the [*name of agency*] for this certification is: [*Insert definition used and explain rationale for the alternative.*]"

"Comments are solicited on the appropriateness of this size standard in certifying that this rule will not have a significant impact on a substantial number of small entities."

What Attempts at Outreach Have Been Made?

Section 609 of the Act requires agencies to ensure that small entities have an opportunity to participate in any rulemaking that will have a significant economic impact on a substantial number of small entities. Agency compliance with section 609(a) of the Act, as it relates to the preparation of the final regulatory flexibility analysis, is subject to judicial review. Section 609(a)(1)–(5)

requires the reasonable use of specific techniques for gathering the comments of small entities. Among the techniques listed in the RFA are:

• "The inclusion in an advanced notice of proposed rulemaking, if issued, of a statement that the proposed rule may have a significant economic impact on a substantial number of small entities." (5 U.S.C. § 609(a)(1)).

Office of Advocacy Comment: This explicit statement will alert small entities to the rule's potential impacts on them, increasing their ability to participate in an informed way in the critically important early stages of regulatory development. It also may help agencies identify sources of specialized expertise that may make it easier to identify a rule's impact on small entities and develop alternatives to reduce or eliminate the impacts before a rule is fully developed and proposed.

• "The publication of general notice of proposed rulemaking in publications likely to be obtained by small entities." (5 U.S.C. § 609(a)(2)).

Office of Advocacy Comment: Most small entities do not have ready access to, or cannot effectively monitor, the *Federal Register*. They may, however, be associated with national and state organizations and trade associations that notify their members of pending regulatory actions through newsletters, newspapers, magazines, and trade publications. Agencies should maintain current lists of organizations. The Office of Advocacy maintains a list of some small business representatives and can provide this information to the agencies upon request.

• "The direct notification of interested small entities." (5 U.S.C. § 609(a)(3)).

Office of Advocacy Comment: Associations that represent small businesses and other small entities are frequently the best resources for notifying the affected small business community. However, many small entities, especially small businesses, are not members of associations. Therefore, it may be helpful to use other communications options, such as public service announcements, to reach as many underrepresented small entities as possible. Agencies should consider using official announcements in newspapers or magazines of general circulation to reach small entities not otherwise readily accessible for important rules.

• "The conduct of open conferences or public hearings concerning the rule for small entities including soliciting and receiving comments over computer networks." (5 U.S.C. § 609(4)).

Office of Advocacy Comment: Creating an environment for open dialog by speaking, for example, to groups of interested business persons or creating electronic communication vehicles to reach small businesses and other small entities can be very effective. Agencies are

encouraged to work with regional and state agencies to have representatives listed in speakers' bureaus and to use standard texts and electronic formats to disseminate information to the small business community and other small entities on pending actions that may affect them. Agencies should explore new ways, such as electronic communication and the use of the Internet, to help small entities play a meaningful role in the rulemaking process.

• "The adoption or modification of agency procedural rules to reduce the cost or complexity of participation in the rulemaking by small entities." (5 U.S.C. § 609(a)(5)).

Office of Advocacy Comment: Agencies should consider options such as holding hearings at their regional or district offices to facilitate grass-roots participation by small entities, as well as local trade association representatives, in the rulemaking process. Hearings could also be held in the evenings or on Saturdays to give more small entities an opportunity to participate in the process without taking time from their normal work schedule.

If agencies formalize intragency staff guidance, incorporating some or all of the suggestions outlined under each of the preceding quotes from section 609 of the RFA, participation in the rulemaking process by small entities should increase and improve information available to regulators.

ANALYZING PROPOSED RULES II: PREPARING AN INITIAL REGULATORY FLEXIBILITY ANALYSIS

Once an agency concludes that the RFA applies and that its proposed rule is expected to have a significant economic impact on a substantial number of small entities, an initial regulatory flexibility analysis (IRFA) must be prepared. According to section 605(c), to avoid duplicative action agencies may consider a series of closely related rules as one rule for the purposes of complying with the IRFA requirement.

Section 603 of the RFA sets forth the criteria for what an IRFA must include and specifies that the IRFA be made available for public comment. The IRFA, or a summary thereof, must appear in the *Federal Register* at the time of publication of the proposed rule. The agency must also send a copy of the IRFA to the SBA's chief counsel for advocacy.

Office of Advocacy Comment:

IRFAs in a Nutshell. As a preliminary step, an agency should develop a profile of different-sized entities likely to be affected by the rule. In addition, an agency needs to assess how each of these different-sized entities will be affected. This means that the agency needs to specify the number and type of entities affected, compliance costs, objectives to be achieved, and comparisons of regulatory alternatives to the regulation — alternatives that would minimize economic impacts without sacrificing stated objectives. Data, models, and assumptions should be identified and evaluated explicitly, together with adequate justifications for the alternatives selected.

Section 603 requires agencies to examine the objectives, costs, and other economic implications on the industry sectors targeted by the rule. Impacts examined may include economic viability (including closure), competitiveness, productivity, and employment impacts. To be most useful, such an analysis would also present information on the uncertainty surrounding the analysis and would capture uncertainty within the analysis itself. The analysis should identify cost burdens for the industry sector and/or for the individual small entities affected. Costs might include engineering and hardware acquisition, maintenance and operation, employee skill and training, administrative practices (including recordkeeping and reporting), productivity, and promotion.

The results of the analysis should allow commentors to compare the impacts of regulatory

alternatives on the differing sizes and types of entities targeted and/or affected by the rule, allowing direct comparison of small and large entities to determine the degree to which the alternatives chosen disproportionately affect small entities or a targeted sub-sector.

What the RFA anticipates is that the public be given a road map to an agency's thinking as to the nature of the problem it is trying to address, factors contributing to the problem, what is the most effective way to address the problem, and how much of the issue will be addressed by different regulatory alternatives.

Clearly, there needs to be a balance between thoroughness of an analysis and practical limits of an agency's capacity to carry out the analysis. If economic data are available, then an agency should utilize these data in preparing an RFA analysis. Information on how to conduct an economic analysis, such as the guidelines in OMB's "Economic Analysis of Federal Regulations Under Executive Order 12,866" should be consulted.[38] In addition, small business data, including data referenced in Appendix C, "Small Business Statistics for Regulatory Analysis," should be reviewed.

When data are not readily available, industry outreach can be used to collect data. If none of the foregoing is productive, then agencies should use the Notice of Proposed Rulemaking to solicit data.

Questions to Be Addressed in an IRFA

Some of the important questions to be addressed in preparing an IRFA are:

1. Which small entities will be impacted most? Should the definition of "small entity" be redefined for purposes of the RFA?
2. Are all the required elements of an IRFA present, particularly a description of all compliance requirements, and a clear explanation of the need for and objectives of the rule?
3. Have all major cost factors been developed and analyzed?
4. What alternatives will allow the agency to accomplish its regulatory objectives while minimizing the impact on small entities?
5. When can other statutorily required analyses be used to supplement and/or satisfy the IRFA requirements of the RFA?

[38] Executive Office of the President, Office of Management and Budget, "Economic Analysis of Federal Regulations under Executive Order 12866" (January 1996); reprinted in *Daily Report for Executives* (January 22, 1996), pp. M2–16.

6. Are there circumstances under which preparation of an IRFA may be waived or delayed?

Which small entities will be impacted most? Should the definition of "small entity" be redefined for purposes of the RFA?

After an agency determines that it will prepare an IRFA, it should consider whether the RFA definitions (hence, the SBA size standards[39]) of small entities are suitable for the rule.[40] Although the RFA definitions may be adequate to make an initial determination that a rule will affect small entities, they may not be adequate for purposes of analyzing discrete impacts of the rule or of regulatory alternatives.

The SBA's size standards for small business are generally based on the total number of employees in an enterprise or on gross annual revenues. If the agency determines that the existing SBA size standards for small businesses are not appropriate, section 601 of the RFA permits the agency, after notice and comment, to establish one or more alternative definitions of a small entity that are appropriate for the given rule. Also, in any instance involving a rule's definition of "small business" different from the SBA's size standards, the agency must first consult with the Office of Advocacy.

Are all the required elements of an IRFA present, particularly a description of all compliance requirements, and a clear explanation of the need for and objectives of the rule?

The principal issues to be addressed in an IRFA are the impact of a proposed rule on small entities, and the comparative effectiveness and costs of alternative regulatory options. Under the Act, an IRFA must describe the impact of the proposed rule on small entities and, under section 603(b), must contain the

[39] Small business size standards are published at 13 C.F.R. § 121.201 (1996).

[40] 5 U.S.C. § 601.

following information:

1. a description of the reasons why action by the agency is being considered;
2. a succinct statement of the objectives of, and legal basis for, the proposed rule;
3. a description — and, where feasible, an estimate of the number — of small entities to which the proposed rule will apply;
4. a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and
5. an identification, to the extent practicable, of all relevant federal rules which may duplicate, overlap, or conflict with the proposed rule.

Section 607 of the RFA provides that, in complying with section 603 of the Act, agencies are required to develop a quantitative analysis of the effects of a rule and its alternatives with available data. If, however, quantification is not practicable or reliable, agencies may provide general descriptive statements regarding the rule's effects.[41] This second option appears only to be a last resort, when quantification cannot be achieved.

The approach an agency takes will depend on such factors as the quality and quantity of available information and the anticipated severity of a rule's impacts on small entities subject to the rule.

Office of Advocacy Comment: A thorough description of impact should, to the extent practicable:
• provide a profile of the regulated industry and the number of small entities affected, and divide the industry into sectors and different size categories in order to determine if the impacts are different;

[41] Where a lack of data prohibits quantification, the Office of Advocacy believes that the analysis should identify missing data elements and the aspects of the quantitative analysis that could not be completed. Similarly, reliance on analogous data and assumptions should be identified and fully explained. Explicit explanations of assumptions relied on help the public determine whether the analysis is adequate.

• identify the steps taken to develop a definition of a small entity, if different from the SBA's size standards; and
• identify the small entities expected to face more significant impacts than other industry sectors as a result of the rule.

An IRFA would be most informative if it segmented an industry to determine if regulatory impacts differed, and if it also examined regulatory options that would accommodate the different impacts without sacrificing the objectives of the rule. The rule could then be tailored to address industry segments differently in ways that achieved the same overall regulatory objective. (To obtain industry data refer to Appendix C, "Small Business Statistics for Regulatory Analysis.")

Have all major cost factors been developed and analyzed?

Some of the costs which must be described in an IRFA include any record-keeping, reporting, and professional expertise needed to complete the mandated reports or records.[42]

Office of Advocacy Comment: Many other significant cost factors may exist in a particular rule, and agencies should endeavor to describe and analyze all such cost factors. The fact that the RFA does not specifically outline all potential cost factors is not a license for agencies to avoid performing full and complete analyses. Since all rules are different and impose different compliance requirements, the RFA contemplates that agencies will prepare analyses to determine all significant long- and short-term compliance costs.

Some other costs associated with a rule may include engineering controls, loss or reduction of markets, hiring professional expertise (for example, legal, consulting, or accounting expertise), hiring additional staff, etc.

The IRFA should also, to the extent practicable, compare the costs of compliance for small and large entities to determine if small entities are affected disproportionately. Also, to the extent practicable, the IRFA should analyze the ability of small entities to pass on these costs in the form of price increases or user fees and the effects on profitability or the ability to provide services. The IRFA also might include the resulting effects (if any) on economic viability, production, operating costs, employment, and other economic factors. Ideally, this should be done for each regulatory alternative.

[42] 5 U.S.C. § 603(b)(4).

What alternatives will allow the agency to accomplish its regulatory objective while minimizing the impact on small entities?

The RFA requires agencies to provide a description of any significant alternatives to the proposed rule that accomplish the stated objectives of applicable statutes and that minimize the rule's economic impact on small entities.[43] The development and analysis of realistic alternatives, including no regulation, are major components of the regulatory flexibility analysis. The kinds of alternatives that are possible will vary based on the particular regulatory objective.[44]

Office of Advocacy Comment: The value of the analysis to decision makers (as well as the public) is that it establishes a process for evaluating how to solve problems efficiently and effectively through regulation, without unduly burdening small entities, erecting barriers to competition, or stifling innovation. It helps determine what percentage of a problem can be solved at different cost levels.

The analysis also provides important information to small entities and the general public that helps facilitate informed public commentaries.

The Office of Advocacy offers the following suggestions for developing and evaluating regulatory alternatives:
- Identify regulatory alternatives at the earliest stage of rulemaking.
- Consult representatives of small entities on how best to address the problem the agency is trying to solve, and on which portions of a regulation generate the greatest burdens and/or benefits. Solicit recommendations on workable alternatives. Such consultation will help agencies understand the nature and characteristics of the small entities and the industry being regulated. Agencies should also use the notice and comment process to solicit information on the economic and structural characteristics of the industry and the comparative impacts of different provisions of the rule on small entities.
- Consider and assess the comparative benefits of the rule to large and small entities. A cost-effective alternative that reduces burdens for both large and small entities should also be an option that is evaluated in a regulatory flexibility analysis.

Consistent with the stated objectives of applicable statutes, section 603(c)(1)–(4) of the RFA requires agency analyses to discuss regulatory

[43] 5 U.S.C. § 603(c).

[44] Giving small entities a longer time to comply with the proposed regulation, for instance, will generally reduce the burden on small entities. If the proposed regulation involved new labeling requirements, extending the implementation date would allow the regulated community to deplete the existing inventory of labels, design new ones and implement any new marketing strategies — while accomplishing the regulatory objectives of the agency.

alternatives such as:

- establishment of different compliance or reporting requirements for small entities or timetables that take into account the resources available to small entities;
- clarification, consolidation, or simplification of compliance and reporting requirements for small entities;
- use of performance rather than design standards; and
- exemptions for certain or all small entities from coverage of the rule, in whole or in part.

When can other statutorily required analyses be used to supplement or satisfy the IRFA requirements of the RFA?

Section 605 of the RFA provides that agencies may prepare IRFAs (and FRFAs) in conjunction with, or as a part of, any other analysis required by law as long as the RFA's requirements are satisfied.

For major rules that require the preparation of a regulatory impact analysis (RIA) under Executive Order 12,866,[45] agencies may prepare the RIA and the regulatory flexibility analyses together. Agencies can coordinate their preparation of regulatory flexibility analyses with any other analyses accompanying a rule. In doing so, however, agencies should ensure that such analyses describe explicitly how the requirements of the Regulatory Flexibility Act are satisfied.[46]

Similarly, evaluations of administrative burdens associated with reporting and recordkeeping requirements can be developed in concert with the

[45] On September 30, 1993, the President issued Executive Order 12,866, "Regulatory Planning and Review," superseding the earlier Executive Order 12,291. The process created by this new order ensures that the federal government issues regulations that improve the quality of life without imposing unnecessary costs. The specific goals set forth to achieve this objective are "to enhance planning and coordination with respect to both new and existing regulations, to reaffirm the primacy of federal agencies in the regulatory decision-making process; to restore the integrity and legitimacy of regulatory review and oversight; and to make the process more accessible and open to the public."

[46] See "Economic Analysis of Federal Regulations under Executive Order 12866."

paperwork burden analysis prepared under the Paperwork Reduction Act.

Agencies, however, need to exercise caution when trying to rely on other analyses to satisfy the RFA, because another analysis may not necessarily be a complete substitute for a regulatory flexibility analysis.

For example, Executive Order 12,866 imposes analytical requirements that differ from those of the RFA. The RFA requires agencies to identify and consider alternatives that minimize a rule's impacts on small entities subject to the rule, but does not specifically require that an agency select the alternative with the least impact on small entities or which generates the most benefit for small entities.[47] Executive Order 12,866, on the other hand, requires agencies to select the alternative that provides the maximum net benefit to society, to the extent that it is statutorily feasible. By the same token, although the requirements differ, one should not assume that the analysis performed for one will automatically result in conclusions that will differ from those arrived at under the other. One of the primary purposes of the Executive Order is to ensure the promulgation of cost-effective regulations. The alternative that achieves statutory and regulatory objectives while minimizing small entity impacts under the RFA is likely to be identical to the alternative with the largest net benefit to society. In some cases, however, an agency may find that the regulatory impact analysis and the regulatory flexibility analysis point to different options.

Office of Advocacy Comment: Such conflicts should be resolved on a case-by-case basis, in accordance with the RFA and other underlying statutes, and in consultation with the agencies' respective Offices of General Counsel. Although an agency is not required to consult the Office of Advocacy for the resolution of such conflicts, such consultation will help agencies obtain information on small-entity impacts that may help resolve the conflict.

Are there circumstances under which preparation of an IRFA may be waived or delayed?

Section 608 of the RFA provides that an agency may waive or delay the completion of some or all the requirements of section 603 regarding prepara-

[47] See 5 U.S.C. § 603(c).

tion of IRFAs if the rule is being promulgated in response to an emergency that makes compliance with the RFA impracticable.[48] Promulgating agencies must publish the waiver or delay in the *Federal Register* no later than the date of publication of the final rule. If a true emergency exists, the agency must explain clearly why the circumstances are emergent.

Agencies should note that the RFA does not specifically allow certifications of proposed (or final) rules issued pursuant to section 605(b) to be waived or delayed. Certifications must be published at the time of the proposed or final rule.

As discussed on page 16 of this guide, federal agencies must make a preliminary assessment regarding the impact of proposed rules on small entities and this assessment, if it results in a certification, is judicially reviewable.

Special Requirements for Regulatory Analysis by EPA and OSHA

Before publication of an IRFA by the Environmental Protection Agency (EPA) or by the Occupational Safety and Health Administration (OSHA), section 609(b) of the RFA requires these agencies to take the following additional steps:

- the agency must provide information to the SBA's chief counsel for advocacy about the potential impact of a proposed rule on small entities and the type of small entities that might be affected;
- within 15 days after receiving the materials, the chief counsel is required to identify representatives of affected small entities to be consulted on the impacts of a proposed rule;
- the agency is then required to convene a review panel consisting of agency employees responsible for carrying out the proposed rule, the OMB's Office of Information and Regulatory Affairs (OIRA), and the SBA's chief counsel for advocacy.

[48] See section 608(b) for details on delaying, but not waiving, a final regulatory flexibility analysis.

• the panel is charged with reviewing RFA materials prepared by the agency, including any draft proposed rule; collecting advice and recommendations of each small-entity representative identified by the agency after consultation with the chief counsel for advocacy on issues related to the contents of an IRFA (section 603(b)(3)–(5)) and the description of the alternatives (section 603(c));

• within 60 days of convening the panel, the panel is required to prepare a report outlining the comments of the small-entity representatives and the panel's findings as to sections 603(b)(3)–(5) and 603(c) — provided that the panel's report shall be made public as part of the rulemaking record; and

• where appropriate, the agency shall modify the proposed rule, the IRFA, or the decision on the need for an IRFA.

Waiver of the EPA or OSHA Panel Review Process

Under section 609(e) of the RFA, the SBA's chief counsel for advocacy, in consultation with the administrator of OIRA and small-entity representatives, may waive the requirements of sections (b)(3)–(5) discussed above, but must state in writing the reasons why the panel requirement would not advance the effective participation of small entities in the rulemaking process. The written finding must be included in the rulemaking record.

According to section 609(e)(1)–(3), the factors to be considered in making the finding to waive the panel are:

• In developing a proposed rule, the extent to which EPA (or OSHA) consulted with small-entity representatives with respect to the potential impacts of the rule and took such concerns into consideration.

• Special circumstances requirement prompt issuance of the rule.

• Whether the requirements of section 609(b) would provide the small-entity representatives with a competitive advantage relative to other small entities.

THE FINAL RULE

An agency's analysis of the public record developed in connection with a proposed rule will help it make a determination whether or not the final version of the rule will or will not have a significant economic impact on a substantial number of small entities. If the former, an agency must prepare a final regulatory flexibility analysis. If the latter, then the head of the agency may so certify.

Certification of "No Significant Economic Impact"

Under section 605(b), if the head of the agency concludes that the final rule "will not have a significant economic impact on a substantial number of small entities," then he or she may so certify. The certification must be published in the *Federal Register* at the same time the final rule is published.

The certification must be accompanied by an explanation of the factual basis for the certification. (See page 22 for the Office of Advocacy's views as to what constitutes a "factual basis.") Both the certification and the statement of factual basis must be provided to the SBA's chief counsel for advocacy. Such certifications are judicially reviewable (5 U.S.C. § 611(a)(1) and (2)).

Office of Advocacy Comment: As indicated earlier in the discussion concerning IRFAs versus certifications, the Act requires that the certification appear in either the proposed *or* final rule. (See 5 U.S.C. § 605(b).) Although it is fairly clear that the certification must appear in the final rule if there is no certification in the proposed rule, it is not clear whether the certification must be duplicated in the final rule if it already appears in the proposed rule.

The Office of Advocacy believes that, given the emphasis in the law on public notice, the certification should also appear in the final rule even though there may have already been a certification in the proposed rule. Doing so will help demonstrate the continued validity of the certification after receipt of public comments.

Final Regulatory Flexibility Analysis

As is the case for IRFAs, FRFAs are not required if the agency head certifies the rule and provides a statement of factual basis therefor. However, when an agency promulgates a final regulation that it concludes will have significant economic impact on a substantial number of small entities, section 604(a) of the RFA requires the agency to prepare a final regulatory flexibility analysis (FRFA). Under section 604(b), the agency is required to publish either the FRFA or a summary of the FRFA in the *Federal Register* at the time of publication of the final rule. The agency must also make copies of the FRFA available to the public. FRFAs are judicially reviewable. According to section 605(c), to avoid duplicative action, agencies may consider a series of closely related rules as one rule when preparing a FRFA.

Issues to Be Addressed in a FRFA

The central focus of the FRFA, like the IRFA, is the requirement that agencies evaluate the impact of a rule on small entities and analyze regulatory alternatives that minimize the impact when there will be a significant economic impact on a substantial number of small entities.

The requirements for a FRFA are somewhat different than those for an IRFA. The requirements, outlined in section 604(a)(1)–(5), are listed and discussed below:

1. a succinct statement of the need for, and objectives of, the rule;

2. a summary of the significant issues raised by the public comments in response to the IRFA, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

3. a description of, and an estimate of the number of, small entities to which the rule will apply or an explanation of why no such estimate is available;

4. a description of the projected reporting, recordkeeping, and other com-

pliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and

5. a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

Requirements 2, 3, and 5 are different from the requirements for an IRFA. The emphasis of the discussion below will therefore focus on those three requirements.

Questions to Be Addressed in a FRFA

Questions 1, 3, 4, and 5 appearing in the IRFA discussion of this guide (see page 27) are also relevant questions to consider when preparing a FRFA. The following additional questions should be addressed in preparing a FRFA:

- Have all significant issues raised in the public comments regarding the IRFA been summarized and assessed, and have any changes been made since the publication of the proposed rule as a result of the comments?
- Is it possible to estimate the number of small entities to which the rule will apply? If not, why?
- What steps have been taken to minimize the significant economic impact on small entities?
- Has the statement of factual, policy, and legal reasons for selecting the alternative adopted in the final rule, and the reasons for rejecting other significant alternatives, been included?

Have all significant issues raised in the public comments regarding the IRFA been summarized and assessed, and have any changes been made since the publication of the proposed rule as a result of the comments?

The RFA does not require agencies to address every single comment raised during the public comment period — only the significant ones. The RFA does require agencies to assess (and not just present) the significant comments raised. There is also a requirement to publish in the final rule the specific changes that have been made since publication of the proposed rule in response to the comments. Although there is no requirement to do so, some agencies include in their FRFAs the number of times a particular comment was raised.

Is it possible to estimate the number of small entities to which the rule will apply? If not, why?

There is a requirement to estimate the number of small entities likely to be impacted when preparing and IRFA. There is an additional requirement for FRFAs, however, because agencies must explain why no estimates are available if in fact none are available.

Office of Advocacy Comment: To avoid successful challenges to final rules under the judicial review provisions of the RFA, it is in the best interest of regulatory agencies to construct public records that reflect aggressive and meaningful efforts to compile economic data on the industries/organizational sectors to be regulated and the economic impacts on small entities within those industries/organizational sectors. If such efforts produce inconclusive data or fail entirely, then at least agencies will be able to explain, for the record, why such data were not available.

What steps have been taken to minimize the significant economic impact on small entities?

Agencies may consider and adopt one or multiple alternatives to minimize the burden on small entities. Some of those alternatives may include: lengthening the time for compliance; tiering the compliance requirements based on the size of the business or degree to which small entities contribute to the problem;

providing for exemptions for parts of the rule or the entire rule for small entities; timing compliance to correspond with other statutory deadlines with related requirements; allowing for increased flexibility in the methods used for achieving the agency's objectives (for example, allowing more than one type of air filter to be used to achieve a specified level of air quality); making requirements less prescriptive; etc.

Has the statement of factual, policy, and legal reasons for selecting the alternative adopted in the final rule, and the reasons for rejecting other significant alternatives, been included?

Office of Advocacy Comment: SBREFRA made significant changes to this section of the RFA with regard to compliance requirements.[49] Prior to 1996, an agency needed only to state the alternatives and the reason (or reasons) for rejecting a particular alternative. As result of the amendments, an agency must now include a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule. The agency must also detail for the public record why each of the other significant alternatives was rejected. The changes suggest that it is not enough to say that an alternative was considered and rejected or accepted. There should be significant articulable and supportable reasons for selecting alternatives.

The Office of Advocacy believes the development and consideration of alternatives is likely to be an issue in judicial review of a rule. It is, however, noteworthy that while the FRFA imposes an analytical discipline on regulatory decision-making, it also provides agencies with an opportunity to showcase their expertise by requiring that they provide, for the record, credible substantiation for their rejection of significant alternatives.

Permissible Delays in Publication of a FRFA

Section 608(b) of the RFA provides that an agency may delay, but not waive, the completion of a FRFA if the rule is being promulgated in response to an emergency that makes compliance with the RFA impracticable. When an agency acts under this provision, it must publish its reasons for the delay when

[49] See 5 U.S.C. § 604(a)(5).

it publishes the final rule. Preparation of a FRFA may be delayed for up to 180 days after a final rule is published. If a FRFA has not been prepared within the designated time, the rule will lapse and have no effect.

The rule may not be re-promulgated until the agency completes a FRFA. Agency actions under section 608(b) of the Act are subject to judicial review.

JUDICIAL REVIEW

Arguably, the most significant amendment made by SBREFA to the RFA is the provision that permits judicial review of agency compliance with certain provisions of the RFA. This amendment gives small entities the opportunity to ensure that agencies comply with the analytical processes Congress intended be followed when it enacted the RFA in 1980.

Under the new section 611 added to the RFA, a small entity that is adversely affected or aggrieved by a final agency rulemaking may seek review of the agency's non-compliance with certain provisions of the RFA. The particular provisions of the RFA subject to judicial review are:

- section 601, definitions, including "small business," "small organization" and "small governmental jurisdiction";
- section 604, preparation of final regulatory flexibility analyses;
- section 605(b), certification that a rule will not have a significant economic impact on a substantial number of small entities;
- section 607, agency's description of the effects of the rule or the rule's alternatives as this section relates to agency compliance with preparation of a FRFA (section 604);
- section 608(b), delay of FRFA completion;
- section 609(a), procedures for gathering comments as this section relates to agency compliance with preparation of a FRFA (section 604), and;
- section 610, periodic review of agency rules.

Office of Advocacy Comment: Although IRFAs are not directly reviewable, the importance of a proper IRFA cannot be underestimated. A proper IRFA provides the necessary foundation for a good FRFA. In many instances, an agency cannot develop an adequate FRFA if the IRFA did not lay the proper foundation for eliciting public comments and seeking additional economic data and information on the regulated industry's profile and regulatory impacts. Moreover, without an adequate IRFA, small entities cannot provide informed

comments on regulatory alternatives that are not adequately addressed in the IRFA.

Timely Appeals

A small entity may seek court review under section 611 during the period beginning on the date of final agency action and ending one year later, except where a provision of law requires such action to be initiated within a period shorter than one year.

When an agency delays the issuance of a FRFA, an action for judicial review must be filed within one year after the date the analysis is made available to the public or in a shorter period where specifically prescribed by law.

Judicial Remedies

Section 611(a)(4) provides that in granting relief in an action under the RFA, the court shall order the agency to take corrective action consistent with the RFA and with the judicial review provisions of the APA under Chapter 7 of the APA.[50] Such actions include, but are not limited to, remanding the rule to the agency or deferring the enforcement of the rule against small businesses, unless the court finds the continued enforcement of the rule to be in the best interest of the public. The court also may require the publication of a new IRFA and/or FRFA to remedy non-compliance, stay the effective date of a rule, or grant other relief that it may deem necessary.

[50] See 5 U.S.C. § 701.

CONCLUSION

The introduction to this guide stated that the RFA does not seek preferential treatment for small entities; does not require agencies to adopt regulations that impose the least burden on small entities; and does not mandate exemptions for small entities. Rather, as this guide has illustrated, the RFA:

- establishes an analytical process for determining how public policy issues can best be achieved without erecting barriers to competition, or stifling innovation or imposing undue burdens on small entities; and
- seeks a level playing field for small entities, not an unfair advantage.

This guide is designed to help institutionalize these concepts so that they become part of a regulatory agency's analytical fiber. The SBA's Office of Advocacy hopes that this guide helps to achieve this objective.

Appendix A: The Regulatory Flexibility Act

The following text of the Regulatory Flexibility Act of 1980, as amended, is taken from Title 5 of the United States Code, Sections 601–612. The Regulatory Flexibility Act was originally passed in 1980 (P.L. 96-354). The Act was amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (P.L. 104-121).

Congressional Findings and Declaration of Purpose

(a) The Congress finds and declares that —

(1) when adopting regulations to protect the health, safety and economic welfare of the Nation, Federal agencies should seek to achieve statutory goals as effectively and efficiently as possible without imposing unnecessary burdens on the public;

(2) laws and regulations designed for application to large scale entities have been applied uniformly to small businesses, small organizations, and small governmental jurisdictions even though the problems that gave rise to government action may not have been caused by those smaller entities;

(3) uniform Federal regulatory and reporting requirements have in numerous instances imposed unnecessary and disproportionately burdensome demands including legal, accounting and consulting costs upon small businesses, small organizations, and small governmental jurisdictions with limited resources;

(4) the failure to recognize differences in the scale and resources of regulated entities has in numerous instances adversely affected competition in the marketplace, discouraged innovation and restricted improvements in productivity;

(5) unnecessary regulations create entry barriers in many industries and discourage potential entrepreneurs from introducing beneficial products and processes;

(6) the practice of treating all regulated businesses, organizations, and governmental jurisdictions as equivalent may lead to inefficient use of regulatory agency resources, enforcement problems and, in some cases, to actions inconsistent with the legislative intent of health, safety, environmental and economic welfare legislation;

(7) alternative regulatory approaches which do not conflict with the stated objectives of applicable statutes may be available which minimize the significant economic impact of rules

on small businesses, small organizations, and small governmental jurisdictions;

(8) the process by which Federal regulations are developed and adopted should be reformed to require agencies to solicit the ideas and comments of small businesses, small organizations, and small governmental jurisdictions to examine the impact of proposed and existing rules on such entities, and to review the continued need for existing rules.

(b) It is the purpose of this Act [enacting this chapter and provisions set out as notes under this section] to establish as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.

Regulatory Flexibility Act

§ 601 Definitions

§ 602 Regulatory agenda

§ 603 Initial regulatory flexibility analysis

§ 604 Final regulatory flexibility analysis

§ 605 Avoidance of duplicative or unnecessary analyses

§ 606 Effect on other law

§ 607 Preparation of analyses

§ 608 Procedure for waiver or delay of completion

§ 609 Procedures for gathering comments

§ 610 Periodic review of rules

§ 611 Judicial review

§ 612 Reports and intervention rights

§ 601. Definitions

For purposes of this chapter —

(1) the term "agency" means an agency as defined in section 551(1) of this title;

(2) the term "rule" means any rule for which the agency publishes a general notice of proposed rulemaking pursuant to section 553(b) of this title, or any other law, including any rule of general applicability governing Federal grants to State and local governments for which the agency provides an opportunity for notice and public comment, except that the term "rule" does not include a rule of particular applicability relating to rates, wages, corporate or financial structures or reorganizations thereof, prices, facilities, appliances, services, or allowances therefor or to valuations, costs or accounting, or practices relating to such rates, wages, structures, prices, appliances, services, or allowances;

(3) the term "small business" has the same meaning as the term "small business concern" under section 3 of the Small Business Act, unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register;

(4) the term "small organization" means any not-for-profit enterprise which is independently owned and operated and is not dominant in its field, unless an agency establishes, after opportunity for public comment, one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register;

(5) the term "small governmental jurisdiction" means governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand, unless an agency establishes, after opportunity for public comment, one or more definitions of such term which are appropriate to the activities of the agency and which are based on such factors as location in rural or sparsely populated areas or limited revenues due to the population of such jurisdiction, and publishes such definition(s) in the Federal Register;

(6) the term "small entity" shall have the same meaning as the terms "small business", "small organization" and "small governmental jurisdiction" defined in paragraphs (3), (4) and (5) of this section; and

(7) the term "collection of information" —

(A) means the obtaining, causing to be obtained, soliciting, or requiring the disclosure to third parties or the public, of facts or opinions by or for an agency, regardless of form or format, calling for either —

(i) answers to identical questions posed to, or identical reporting or recordkeeping requirements imposed on, 10 or more persons, other than agencies, instrumentalities, or employees of the United States; or

(ii) answers to questions posed to agencies, instrumentalities, or employees of the United States which are to be used for general statistical purposes; and

(B) shall not include a collection of information described under section 3518(c)(1) of title 44, United States Code.

(8) Recordkeeping requirement — The term "recordkeeping requirement" means a requirement imposed by an agency on persons to maintain specified records.

§ 602. Regulatory agenda

(a) During the months of October and April of each year, each agency shall publish in the Federal Register a regulatory flexibility agenda which shall contain —

(1) a brief description of the subject area of any rule which the agency expects to propose or promulgate which is likely to have a significant economic impact on a substantial number of small entities;

(2) a summary of the nature of any such rule under consideration for each subject area listed in the agenda pursuant to paragraph (1), the objectives and legal basis for the issuance of the rule, and an approximate schedule for completing action on any rule for which the agency has issued a general notice of proposed rulemaking, and

(3) the name and telephone number of an agency official knowledgeable concerning the items listed in paragraph (1).

(b) Each regulatory flexibility agenda shall be transmitted to the Chief Counsel for Advocacy of the Small Business Administration for comment, if any.

(c) Each agency shall endeavor to provide notice of each regulatory flexibility agenda to small entities or their representatives through direct notification or publication of the agenda in publications likely to be obtained by such small entities and shall invite comments upon each subject area on the agenda.

(d) Nothing in this section precludes an agency from considering or acting on any matter not included in a regulatory flexibility agenda, or requires an agency to consider or act on any matter listed in such agenda.

§ 603. Initial regulatory flexibility analysis

(a) Whenever an agency is required by section 553 of this title, or any other law, to publish general notice of proposed rulemaking for any proposed rule, or publishes a notice of proposed rulemaking for an interpretative rule involving the internal revenue laws of the United States, the agency shall prepare and make available for public comment an initial regulatory flexibility analysis. Such analysis shall describe the impact of the proposed rule on small entities. The initial regulatory flexibility analysis or a summary shall be published in the Federal Register at the time of the publication of general notice of proposed rulemaking for the rule. The agency shall transmit a copy of the initial regulatory flexibility analysis to the Chief Counsel for Advocacy of the Small Business Administration. In the case of an interpretative rule involving the internal revenue laws of the United States, this chapter applies to interpretative rules published in the Federal Register for codification in the Code of Federal Regulations, but only to the extent that such interpretative rules impose on small entities a collection of information requirement.

(b) Each initial regulatory flexibility analysis required under this section shall contain —

(1) a description of the reasons why action by the agency is being considered;

(2) a succinct statement of the objectives of, and legal basis for, the proposed rule;

(3) a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;

(4) a description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

(5) an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule.

(c) Each initial regulatory flexibility analysis shall also contain a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives such as —

(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;

(2) the clarification, consolidation, or simplification of compliance and reporting require-

ments under the rule for such small entities;

(3) the use of performance rather than design standards; and

(4) an exemption from coverage of the rule, or any part thereof, for such small entities.

§ 604. Final regulatory flexibility analysis

(a) When an agency promulgates a final rule under section 553 of this title, after being required by that section or any other law to publish a general notice of proposed rulemaking, or promulgates a final interpretative rule involving the internal revenue laws of the United States as described in section 603(a), the agency shall prepare a final regulatory flexibility analysis. Each final regulatory flexibility analysis shall contain —

(1) a succinct statement of the need for, and objectives of, the rule;

(2) a summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

(3) a description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

(4) a description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and

(5) a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

(b) The agency shall make copies of the final regulatory flexibility analysis available to members of the public and shall publish in the Federal Register such analysis or a summary thereof.

§ 605. Avoidance of duplicative or unnecessary analyses

(a) Any Federal agency may perform the analyses required by sections 602, 603, and 604 of this title in conjunction with or as a part of any other agenda or analysis required by any other law if such other analysis satisfies the provisions of such sections.

(b) Sections 603 and 604 of this title shall not apply to any proposed or final rule if the head of the agency certifies that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. If the head of the agency makes a certification under the preceding sentence, the agency shall publish such certification in the Federal Register at the time of publication of general notice of proposed rulemaking for the rule or at the time of publication of the final rule, along with a statement providing the factual basis for such certification. The agency shall provide such certification and statement to the Chief Counsel for Advocacy of the Small Business Administration.

(c) In order to avoid duplicative action, an agency may consider a series of closely related rules as one rule for the purposes of sections 602, 603, 604 and 610 of this title.

§ 606. Effect on other law

The requirements of sections 603 and 604 of this title do not alter in any manner standards otherwise applicable by law to agency action.

§ 607. Preparation of analyses

In complying with the provisions of sections 603 and 604 of this title, an agency may provide either a quantifiable or numerical description of the effects of a proposed rule or alternatives to the proposed rule, or more general descriptive statements if quantification is not practicable or reliable.

§ 608. Procedure for waiver or delay of completion

(a) An agency head may waive or delay the completion of some or all of the requirements of section 603 of this title by publishing in the Federal Register, not later than the date of publication of the final rule, a written finding, with reasons therefor, that the final rule is being promulgated in response to an emergency that makes compliance or timely compliance with the provisions of section 603 of this title impracticable.

(b) Except as provided in section 605(b), an agency head may not waive the requirements of section 604 of this title. An agency head may delay the completion of the requirements of section 604 of this title for a period of not more than one hundred and eighty days after the

date of publication in the Federal Register of a final rule by publishing in the Federal Register, not later than such date of publication, a written finding, with reasons therefor, that the final rule is being promulgated in response to an emergency that makes timely compliance with the provisions of section 604 of this title impracticable. If the agency has not prepared a final regulatory analysis pursuant to section 604 of this title within one hundred and eighty days from the date of publication of the final rule, such rule shall lapse and have no effect. Such rule shall not be repromulgated until a final regulatory flexibility analysis has been completed by the agency.

§ 609. Procedures for gathering comments

(a) When any rule is promulgated which will have a significant economic impact on a substantial number of small entities, the head of the agency promulgating the rule or the official of the agency with statutory responsibility for the promulgation of the rule shall assure that small entities have been given an opportunity to participate in the rulemaking for the rule through the reasonable use of techniques such as —

(1) the inclusion in an advanced notice of proposed rulemaking, if issued, of a statement that the proposed rule may have a significant economic effect on a substantial number of small entities;

(2) the publication of general notice of proposed rulemaking in publications likely to be obtained by small entities;

(3) the direct notification of interested small entities;

(4) the conduct of open conferences or public hearings concerning the rule for small entities including soliciting and receiving comments over computer networks; and

(5) the adoption or modification of agency procedural rules to reduce the cost or complexity of participation in the rulemaking by small entities.

(b) Prior to publication of an initial regulatory flexibility analysis which a covered agency is required to conduct by this chapter —

(1) a covered agency shall notify the Chief Counsel for Advocacy of the Small Business Administration and provide the Chief Counsel with information on the potential impacts of the proposed rule on small entities and the type of small entities that might be affected;

(2) not later than 15 days after the date of receipt of the materials described in paragraph (1), the Chief Counsel shall identify individuals representative of affected small entities for the purpose of obtaining advice and recommendations from those individuals about the

potential impacts of the proposed rule;

(3) the agency shall convene a review panel for such rule consisting wholly of full time Federal employees of the office within the agency responsible for carrying out the proposed rule, the Office of Information and Regulatory Affairs within the Office of Management and Budget, and the Chief Counsel;

(4) the panel shall review any material the agency has prepared in connection with this chapter, including any draft proposed rule, collect advice and recommendations of each individual small entity representative identified by the agency after consultation with the Chief Counsel, on issues related to subsections 603(b), paragraphs (3), (4) and (5) and 603(c);

(5) not later than 60 days after the date a covered agency convenes a review panel pursuant to paragraph (3), the review panel shall report on the comments of the small entity representatives and its findings as to issues related to subsections 603(b), paragraphs (3), (4) and (5) and 603(c), provided that such report shall be made public as part of the rulemaking record; and

(6) where appropriate, the agency shall modify the proposed rule, the initial regulatory flexibility analysis or the decision on whether an initial regulatory flexibility analysis is required.

(c) An agency may in its discretion apply subsection (b) to rules that the agency intends to certify under subsection 605(b), but the agency believes may have a greater than de minimis impact on a substantial number of small entities.

(d) For purposes of this section, the term "covered agency" means the Environmental Protection Agency and the Occupational Safety and Health Administration of the Department of Labor.

(e) The Chief Counsel for Advocacy, in consultation with the individuals identified in subsection (b)(2), and with the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget, may waive the requirements of subsections (b)(3), (b)(4), and (b)(5) by including in the rulemaking record a written finding, with reasons therefor, that those requirements would not advance the effective participation of small entities in the rulemaking process. For purposes of this subsection, the factors to be considered in making such a finding are as follows:

(1) In developing a proposed rule, the extent to which the covered agency consulted with individuals representative of affected small entities with respect to the potential impacts of the rule and took such concerns into consideration.

(2) Special circumstances requiring prompt issuance of the rule.

(3) Whether the requirements of subsection (b) would provide the individuals identified in subsection (b)(2) with a competitive advantage relative to other small entities.

§ 610. Periodic review of rules

(a) Within one hundred and eighty days after the effective date of this chapter, each agency shall publish in the Federal Register a plan for the periodic review of the rules issued by the agency which have or will have a significant economic impact upon a substantial number of small entities. Such plan may be amended by the agency at any time by publishing the revision in the Federal Register. The purpose of the review shall be to determine whether such rules should be continued without change, or should be amended or rescinded, consistent with the stated objectives of applicable statutes, to minimize any significant economic impact of the rules upon a substantial number of such small entities. The plan shall provide for the review of all such agency rules existing on the effective date of this chapter within ten years of that date and for the review of such rules adopted after the effective date of this chapter within ten years of the publication of such rules as the final rule. If the head of the agency determines that completion of the review of existing rules is not feasible by the established date, he shall so certify in a statement published in the Federal Register and may extend the completion date by one year at a time for a total of not more than five years.

(b) In reviewing rules to minimize any significant economic impact of the rule on a substantial number of small entities in a manner consistent with the stated objectives of applicable statutes, the agency shall consider the following factors —

(1) the continued need for the rule;

(2) the nature of complaints or comments received concerning the rule from the public;

(3) the complexity of the rule;

(4) the extent to which the rule overlaps, duplicates or conflicts with other Federal rules, and, to the extent feasible, with State and local governmental rules; and

(5) the length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule.

(c) Each year, each agency shall publish in the Federal Register a list of the rules which have a significant economic impact on a substantial number of small entities, which are to be reviewed pursuant to this section during the succeeding twelve months. The list shall include a brief description of each rule and the need for and legal basis of such rule and shall invite

public comment upon the rule.

§ 611. Judicial review

(a)(1) For any rule subject to this chapter, a small entity that is adversely affected or aggrieved by final agency action is entitled to judicial review of agency compliance with the requirements of sections 601, 604, 605(b), 608(b), and 610 in accordance with chapter 7. Agency compliance with sections 607 and 609(a) shall be judicially reviewable in connection with judicial review of section 604.

(2) Each court having jurisdiction to review such rule for compliance with section 553, or under any other provision of law, shall have jurisdiction to review any claims of noncompliance with sections 601, 604, 605(b), 608(b), and 610 in accordance with chapter 7. Agency compliance with sections 607 and 609(a) shall be judicially reviewable in connection with judicial review of section 604.

(3)(A) A small entity may seek such review during the period beginning on the date of final agency action and ending one year later, except that where a provision of law requires that an action challenging a final agency action be commenced before the expiration of one year, such lesser period shall apply to an action for judicial review under this section.

(B) In the case where an agency delays the issuance of a final regulatory flexibility analysis pursuant to section 608(b) of this chapter, an action for judicial review under this section shall be filed not later than —

(i) one year after the date the analysis is made available to the public, or

(ii) where a provision of law requires that an action challenging a final agency regulation be commenced before the expiration of the 1-year period, the number of days specified in such provision of law that is after the date the analysis is made available to the public.

(4) In granting any relief in an action under this section, the court shall order the agency to take corrective action consistent with this chapter and chapter 7, including, but not limited to —

(A) remanding the rule to the agency, and

(B) deferring the enforcement of the rule against small entities unless the court finds that continued enforcement of the rule is in the public interest.

(5) Nothing in this subsection shall be construed to limit the authority of any court to stay the effective date of any rule or provision thereof under any other provision of law or to

grant any other relief in addition to the requirements of this section.

(b) In an action for the judicial review of a rule, the regulatory flexibility analysis for such rule, including an analysis prepared or corrected pursuant to paragraph (a)(4), shall constitute part of the entire record of agency action in connection with such review.

(c) Compliance or noncompliance by an agency with the provisions of this chapter shall be subject to judicial review only in accordance with this section.

(d) Nothing in this section bars judicial review of any other impact statement or similar analysis required by any other law if judicial review of such statement or analysis is otherwise permitted by law.

§ 612. Reports and intervention rights

(a) The Chief Counsel for Advocacy of the Small Business Administration shall monitor agency compliance with this chapter and shall report at least annually thereon to the President and to the Committees on the Judiciary and Small Business of the Senate and House of Representatives.

(b) The Chief Counsel for Advocacy of the Small Business Administration is authorized to appear as amicus curiae in any action brought in a court of the United States to review a rule. In any such action, the Chief Counsel is authorized to present his or her views with respect to compliance with this chapter, the adequacy of the rulemaking record with respect to small entities and the effect of the rule on small entities.

(c) A court of the United States shall grant the application of the Chief Counsel for Advocacy of the Small Business Administration to appear in any such action for the purposes described in subsection (b).

Appendix B: About the SBA's Office of Advocacy

The Office of Advocacy of the U.S. Small Business Administration, established by Congress in 1976 under Public Law 94-305, serves a unique role in government. Headed by a chief counsel for advocacy, the Office's mission is to represent the views of small business before federal agencies and Congress. The chief counsel for advocacy also is charged with monitoring federal agencies' compliance with the Regulatory Flexibility Act (5 U.S.C. § 601) and reporting annually to Congress on its implementation. In brief, the office's statutory responsibilities are to:

- examine the role of small business in the economy and its contributions to competition;
- evaluate the financial markets and the credit needs of small business;
- measure the cost of regulations on small businesses using economic research; and
- monitor federal agency compliance with the Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996.

The chief counsel for advocacy is a presidential appointee confirmed by the U.S. Senate. Under the Office of Advocacy's legislative mandate to represent small business views before the Congress and federal policymakers, the chief counsel for advocacy may take (and at times has taken) positions contrary to those of the administration and Congress on matters affecting small businesses.

Three units within the Office of Advocacy carry out its functions: the Office of Interagency Affairs, the Office of Economic Research, and the Office of Public Liaison.

The Office of Interagency Affairs, staffed primarily by attorneys, is active in policy development. Its major responsibility is the review of regulatory proposals from all federal agencies. The Office of Advocacy scrutinizes regulations for their impact on small business and submits formal comments to agencies about their proposed regulations, their economic analyses regarding

the economic impacts of these proposed regulations on small business, and the agencies' compliance with the Regulatory Flexibility Act. In a court of appeals, the Office of Advocacy has the statutory authority under the Regulatory Flexibility Act to file an *amicus curiae* brief.[1] Also pursuant to its statutory authority, the Office of Interagency Affairs prepares an annual report to Congress and the President on federal agencies' compliance with the RFA.[2] In addition to reviewing regulatory proposals, the staff of the Office of Interagency Affairs develop policy proposals and comment on proposed legislation before the Congress.

The Office of Economic Research co-sponsors data collection by agencies such as the Bureau of the Census, the Federal Reserve Board, and the Internal Revenue Service on important small business topics including small-firm characteristics, minority- and women-owned businesses, and small business economic trends. Through the Office of Advocacy, government entities and the general public can access Census data for some 1,200 industries organized by four-digit standard industrial classification (SIC) codes and data for 900 industries on a state-by-state basis by two-digit SIC codes. Another resource made available by the Office of Economic Research is banking data that makes available, for the first time, comprehensive data on banks' lending to small businesses.[3]

The Office of Economic Research also sponsors small business research on subjects such as acquisitions and mergers, competition, employment and training, franchising, regulations, energy, productivity, taxes, and women- and minority-owned businesses. Each year, the Office of Economic Research compiles economic data on small business and information on policy research that is published in *The State of Small Business: A Report of the President.*

[1] See 5 U.S.C. § 612(b), (c).

[2] See 5 U.S.C. § 612(a); for the annual report, see U.S. Small Business Administration, Office of Advocacy, *Annual Report of the Chief Counsel for Advocacy on Implementation of the Regulatory Flexibility Act* (Washington, D.C.: U.S. Small Business Administration, 1983–1997).

[3] For the latest edition, see U.S. Small Business Administration, Office of Advocacy, *Small Business Lending in the United States,* report no. PB97-141410 (Springfield, Va.: National Technical Information Service, 1997).

As the outreach branch of the Office of Advocacy, the Office of Public Liaison publishes a monthly newsletter, *The Small Business Advocate*, disseminating it to approximately 10,000 individuals, academicians, trade associations, and others interested in small business issues. The Office of Public Liaison also edits and manages the publication of numerous Office of Advocacy documents such as: *The State of Small Business: A Report of the President*; *Catalog of Small Business Research*; annual implementation reports on the 1995 White House Conference on Small Business; *Small Business Economic Indicators*; and the *Annual Report of the Chief Counsel for Advocacy on Implementation of the Regulatory Flexibility Act.*

The Office of Advocacy engages in a wide range of other projects designed to encourage the growth of small businesses. The Office continues to oversee projects such as:

- the implementation of the recommendations of the 1995 White House Conference on Small Business;
- the initiation of an Internet-based investment service, called ACE-*Net*, that is designed to improve small business access to venture capital;
- the development of a model stock purchase agreement that will reduce the costs of negotiated agreements for equity investments in small businesses across state lines; and
- the establishment of a procurement system, called PRO-*Net*, an Internet-based resource that, among other things, makes available to government procurement offices and contractors information about women-owned firms and minority-owned firms that are part of the SBA's 8(a) program.

Additional information about the Office of Advocacy is available from: Office of Advocacy, U.S. Small Business Administration, 409 Third Street, S.W., Washington, DC 20416. Telephone (202) 205-6532; fax (202) 205-6928; Internet home page: *http://www.sba.gov/ADVO/.*

Policy Specialists in the Office of Advocacy

Policy Area	*Policy Advocate*	*Telephone Number*
Banking and finance	Gregory Dean	205-6951
Environmental policy	Kevin Bromberg	205-6964
	Damon Dozier	205-6936
Food and drug policy and health-care reform	Shawne Carter McGibbon	205-6945
Industrial and worker safety and health; transportation issues	Sarah Rice	205-6955
Innovation and technology	Terry Bibbens	205-6983
International trade, economic regulations, labor standards	Jennifer Smith	205-6943
Procurement and contracts	[vacant]	205-6929
Tax and pensions	Russell Orban	205-6946
Telecommunications	S. Jenell Trigg	205-6950

Appendix C: Small Business Statistics for Regulatory Analysis

Regulatory analysis is part art and part science. Not only must the right questions be asked, but they must be asked in a way that takes into account the strengths and weaknesses of the various data sources that are available. Understanding these strengths and weaknesses constitutes much of the art of regulatory analysis.

One of the most difficult tasks in preparing an analysis for the Regulatory Flexibility Act is locating statistics on small business. The information in this appendix has been furnished to help federal agencies identify data sources appropriate for regulatory analyses.

An estimated 23.2 million business tax returns were filed in the United States in 1996. Of these, 72 percent were sole proprietors; 22 percent were corporations; and 6 percent were partnerships. About 24 percent of tax returns are filed by about 5.4 million firms with employees; the remainder represent the full- and part-time self-employed. By most size standards issued by the U.S. Small Business Administration, about 99.7 percent of all firms are small and have fewer than 500 employees and less than $25 million in sales or assets.

Ideally, the data used to analyze the costs and benefits of government regulations should be longitudinal microdata for individual firms — that is, data which traces performance of a collection of firms over several years. However, virtually all publicly available data on individual firms is subject to confidentiality restrictions. Individual names and addresses not only cannot be disclosed, but data must also be presented so that individual firm performance cannot be identified or intuited, even by statistical manipulation. Therefore, most government agencies release summary information, grouping data by industry, size, and/or location.

There is a problem associated with using grouped data through time: the firms that make up the group change. Some firms are born while others die. Some firms expand into a higher size cohort, while others decline into a smaller size category. It is difficult, if not impossible, to identify clearly changes to

firms that remain in the group from changes in the composition of the group.

The data sources listed here generally cover statistics on industries' employment, payroll, and receipts. Most data bases available from government sources do not provide financial data, the balance sheet and income statement information that is needed to analyze the cost of regulations. This is the most sensitive type of information and is rarely available even in aggregate form. Profit information also is usually unavailable.

While data such as that reported by the Census Bureau will always lag behind the calendar by two to three years, new data on firm dynamics — especially on firm births and deaths — is now becoming more readily available from both public- and private-sector organizations. In cooperation with private companies such as Wells Fargo Bank, and organizations such as the National Federation of Independent Business and the Gallup Organization, dynamic data files are being developed. The Office of Advocacy's newly created Longitudinal Extended Establishment Microdata set (LEEM) contains data for 1990 to 1995 and is the only public data file measuring firm births and deaths.

This appendix also provides some general information on the available federal data sources and definitions used for business organizations.

Definitions

Various terms are used in data collection. It is important for those who use the data to understand the variations and their subtle distinctions.

Establishments. An establishment is the smallest unit in which business activity is conducted and on which statistical information is collected. The establishment concept makes no reference to either ownership or taxpaying status. Furthermore, establishments may be branches of larger firms and may differ from separately owned and operated businesses of similar size in purchasing power, advertising coverage, management and control systems, technical resources, and access to capital and credit. (Most very small businesses are single

establishments.)

Enterprises. The enterprise or firm concept refers to all establishments owned by a "parent" company. For instance, an enterprise may own subsidiaries, branches, and unrelated establishments. In most instances, it is necessary to use the enterprise concept to study the characteristics of small firms since the ownership issue is critical for assessing the impact of a given policy. About 15 percent of total employment is in small establishments (fewer than 100 employees) owned by larger firms (more than 100 employees). There are 5.4 million enterprises in the SBA Small Business Data Base and 6.6 million establishments in 1995. (To see these data, go to the Office of Advocacy's Web site at *www.sba.gov/ADVO/stats*. Click on "data by firm size.")

Taxpaying Units. The concept of a taxpaying unit refers to the legal organization of a business as a sole proprietorship, partnership, or corporation. Generally, tax data make no precise distinction between establishments and enterprises. This makes comparisons across data sources difficult, particularly for large multi-establishment firms which can file taxes as enterprises, branches (subsidiaries) of a parent enterprise, or consolidated corporations.

The Office of Advocacy's Census-Based Small Business Data Base

Beginning in late 1991, the SBA's Office of Advocacy contracted with the Economic Surveys Division of the Bureau of the Census to produce linked longitudinal data files on an enterprise basis. The data base, an extension of the Census Bureau's Enterprise Statistics program, includes information gathered from 5.4 million enterprises and 6.6 million establishments.

The Office of Advocacy's data files generally include the number of establishments, firms, payroll per firm, and receipts per firm for various size classes based on firm employment size. The data are also broken out by location and/or industry.

Annual cross-sectional files of the raw data were produced for 1988 through 1995. The files are available in hard copy, on floppy disk, and on CD-ROM from Advocacy's Office of Economic Research, telephone (202) 205-6530. Data are generally available at the four-digit SIC code level of industrial detail for the United States overall, and at the two-digit level by state. In addition, 1995 industry data delineated for more than 1,200 industries can be downloaded from the Office of Advocacy's Web site at *http://www.sba.gov/ADVO/.*

Customized tabulations or copies of the data base are available. Inquiries may be directed to Mr. Ken Sausman, chief, Research Programming Branch, Bureau of the Census, at (301) 457-2562. (Because of confidentiality restrictions, no individual names or addresses may be provided.)

Some of these data have already been published in other places besides the Internet, including the data tables compiled by the Office of Advocacy and published in the President's annual economic report, *The State of Small Business: A Report of the President,*[1] Other tables from this data base have been published in the SBA's *Handbook of Small Business Data.*[2]

Job Creation and Employment

Files for the 1989–1991, 1990–1993, and 1991–1995 periods produced by the Bureau of the Census under contract with the SBA's Office of Advocacy are now available. These files represent the first U.S. government data from which job creation and employment can be studied for all industries. Contact Advocacy's Office of Economic Research at (202) 205-6530 for further information. Private-sector job creation and employment data, state by state, is

[1] Executive Office of the President, *The State of Small Business: A Report of the President* (Washington, D.C.: U.S. Government Printing Office, annual). Copies of the latest (1995) edition are available for purchase from the Superintendent of Documents, tel. (202) 512-1800. Stock no. 045-000-00273-0.

[2] U.S. Small Business Administration, Office of Advocacy, *Handbook of Small Business Data,* 1994 ed. (Washington, D.C.: U.S. Government Printing Office, 1994). Available for purchase from the Superintendent of Documents, tel. (202) 512-1800. Stock no. 045-000-00270-5.

also available on the Office of Advocacy's Web site at *http://www.sba.gov/ADVO/stats.*

Characteristics of Small Business Owners and Employees, 1997

A publication of the Office of Advocacy, *Characteristics of Small Business Owners and Employees, 1997*,[3] uses data from two sources: the Census Bureau's Current Population Survey (1993–1996) and the Characteristics of Business Owners 1992 (a survey that was co-funded by the Office of Advocacy). It uses these sources to describe these businesses' sources of capital, their profitability, their employees, and the major industry and home-based status of women and minority business owners. Because 85 percent of the firms covered by the Characteristics of Business Owners survey have no employees, this data source provides some information on potential regulatory impacts on very small firms, particularly their ability to pay for such regulations.

Other Federal Agency Data on Small Firms

Federal Reserve Survey of Small Business Finances. Within the last five years, two major surveys of small firm finances have been conducted by the Federal Reserve Board and the Office of Advocacy. The National Surveys of Small Business Finances (NSSBF) have been the most detailed examination to date of the credit needs of small firms, as well as their sources and uses of funds. These data maybe of use for regulatory analysis when issues relating to capital costs associated with regulations are the issue. In each survey, more than 5,000 small firms with fewer than 500 employees provided detailed answers on their uses of banks and bank services and alternative sources of credit, the difficulties encountered in borrowing or raising expansion capital, and their level of

[3] U.S. Small Business Administration, Office of Advocacy, *Characteristics of Small Business Owners and Employees, 1997*, report no. PB98-127111 (Springfield, Va.: National Technical Information Service, 1998). The text is also available on the Office of Advocacy's Internet site at *http://www.sba.gov/ADVO.*

satisfaction in using each type of service. (Because of data limitations, firms without employees were not included in the two surveys.)

The survey results may be obtained from John Wolken at the Federal Reserve Board, (202) 452-2503. A public Statistical Analysis System (SAS) file is available for purchase.

Census' Characteristics of Business Owners Survey. For the year 1987, and again for the 1992–1994 period, the Minority Business Development Agency of the U.S. Department of Commerce and the SBA's Office of Advocacy contracted with the Census Bureau to produce the Characteristics of Business Owners (CBO) Survey data. The CBO is a survey of 125,000 small firms. To be included in the CBO sampling frame, firms needed $5,000 in sales in each respective year, and had to have filed a tax return.

The CBO is the only nationally representative source of information about many of the subjects covered in the survey: demographic characteristics of the owner and economic characteristics of the firm such as sales, export status, franchise status, hours and weeks worked by the business owner, sources of debt and equity capital, etc. The good news is that this source has important data not available elsewhere; the bad news is that the analyst has to be patient enough to modify the data to meet the regulatory questions under analysis.

Copies of *Characteristics of Business Owners: 1992* are available for purchase from the Superintendent of Documents or U.S. Government Bookstores.[4]

IRS Statistics of Income. Each quarter, the Statistics of Income (SOI) division of the Internal Revenue Service publishes the *SOI Bulletin*. This publication contains data for both households and businesses and is an invaluable source of statistical information. Data on business firms are generally classified by receipt size class for proprietorships, partnerships, and corporations.

[4] U.S. Department of Commerce, Bureau of the Census, *Characteristics of Business Owners: 1992*, CBO-1 (Washington, D.C.: U.S. Government Printing Office, 1997).

Data on business profits from the IRS are elusive. For sole proprietors and partnerships, only data on net income are available. The preferred concept — return on assets or return on investment — is not obtainable directly from the tax return; it is available only from the kind of balance sheet information kept by accountants or from private sources like Dun & Bradstreet's *Dun's Financial Profiles.*

For small business corporations, more data are available. The IRS' *Source Book for Corporations* contains data for corporations by asset size class. Balance sheet and income statement information is available for corporations in about 15 different asset classes. From this detailed data, it is possible to calculate rates of return on assets as well as the profits of small business (generally subchapter S) corporations.

Data on Self-Employed Persons. Each year, the March Current Population Survey of the Bureau of the Census asks a series of expanded questions about self-employed persons as part of its firm-size supplement. These questions include the hours and weeks spent working in the business during the previous year, the income earned, the demographics of the business owner, whether the firm (owner) has or provides benefits, and several related questions about the industry of the firm.

These data are available from the Population Division of the Bureau of the Census at (301) 763-4100.

Private Data Sources

The Kauffman – Ernst and Young Data Base of Fast Growth Companies (KEYFGC) is a promising new data base that relies on data from two sources: the accounting firm of Ernst and Young for employment and sales information, and the Dun & Bradstreet Corporation for financial data. Information currently available on each firm covers four years and includes income statement and balance sheet information.

The major promise of this data is the ability to understand where and how fast growing companies develop over time, including details about their locations and industries. In addition, the KEYFGC data set is one of the only data bases with actual financial data available on individual (but unidentified) companies.

Other Sources

Economic Research on Small Businesses. Over its 20-year history, the SBA's Office of Advocacy has contracted for research on a variety of small business topics. A retrospective listing of these research reports to 1995 is available in the SBA's *Catalog of Small Business Research.*[5] Information on subsequent research efforts of the Office of Advocacy is listed on its Web site at *http://www.sba.gov/ADVO/research/.*

[5] U.S. Small Business Administration, Office of Advocacy, *Catalog of Small Business Research*, 1995 ed., report no. PR-861 (Springfield, Va.: National Technical Information Service, 1995). The National Technical Information Service may be contacted at (703) 605-6000.

Appendix D: Additional Provisions of the Small Business Regulatory Enforcement Fairness Act

In addition to amending the Regulatory Flexibility Act, the SBREFA amends the Equal Access to Justice Act and introduces other key reforms to provide regulatory relief to small entities. Inasmuch as this guide is intended as a road map for RFA compliance, the additional SBREFA provisions below are only discussed briefly.

Equal Access to Justice

Sections 231–233 of the SBREFA amended the Equal Access to Justice Act (EAJA). These provisions expanded the ability of parties in litigation with the government to recover attorney fees under that law. In administrative and judicial proceedings, if the government's demand to enforce a party's compliance with a statutory or regulatory requirement is unreasonable when compared with the judgment or decision, the party may be entitled to attorney fees and other expenses related to defending against the action. Allowable attorney fees were increased from $75 per hour under the older version of the law to $125 per hour.

Small Business Compliance Guidance

Section 212 of the SBREFA requires federal agencies to publish compliance guides for rules with significant small-entity impacts. An agency is required to publish one or more compliance guides to help small entities comply with the rule, for each rule (or related series of rules) requiring a final regulatory flexibility analysis. Agencies should develop the guides in plain and simple language so that they can be easily understood by any small entity that might be affected by the rule. Further, the guides may cover both federal and state requirements. Agencies should work closely with affected small entities in

preparing and distributing the guides. Finally, the SBREFA requires agencies to establish a system for addressing compliance inquiries from small entities.

An agency's compliance guidance for a particular rule is not subject to judicial review under the SBREFA. However, in a civil or administrative action against a small business for a violation of a particular rule, the content of the agency's written compliance guide or guidance given in response to an inquiry may be considered as evidence of the reasonableness or appropriateness of any proposed fines, penalties or damages.

Oversight and Enforcement

Section 222 of the SBREFA establishes a process whereby small businesses may register complaints against excessive enforcement actions. The new law requires the administrator of the U.S. Small Business Administration to designate a "small business and agriculture regulatory enforcement ombudsman" and to establish a Small Business Regulatory Fairness Board in each of the SBA's 10 regional offices.

Ombudsman The ombudsman works with federal regulatory agencies and receives comments from small businesses concerning enforcement-related activities conducted by agency personnel. The ombudsman has established a process to receive comments from small businesses on agency enforcement activities and, when appropriate, passes such comments on to the agency for review and response. The ombudsman, based on comments received from small business concerns and from Regulatory Fairness Boards (described below), is required to report annually to Congress on agency enforcement efforts.

Regional Boards. Each Small Business Regulatory Fairness Board advises the ombudsman on small business matters relating to agency enforcement activities and assists the ombudsman with the preparation of the annual report to Congress. The boards are authorized to hold hearings. Board members are small business owners and operators who are appointed by the SBA adminis-

trator after consultation with the chairpersons and ranking minority members of both the House and Senate Committees on Small Business.

Rights of Small Entities in Enforcement Actions

Agencies regulating activities of small entities are required, under section 223 of the SBREFA, to establish a policy or program to provide for the reduction (and, under appropriate circumstances, the waiver) of civil penalties for violations of a statutory or regulatory requirement by a small entity. Agencies had until March 1997 to implement this provision. Under appropriate circumstances, an agency may consider ability to pay as a factor in determining penalty assessments on small entities.

Policies or programs established by agencies should contain conditions or exclusions that may include, but not be limited to:

- requiring a small entity to correct the violation within a reasonable period of time;
- limiting the applicability of the policy to violations discovered through participation by a small entity in a compliance assistance or audit program operated or supported by the agency or a state;
- excluding small entities that have been subject to multiple enforcement actions by the agency;
- excluding violations involving willful or criminal conduct;
- excluding violations that pose serious health, safety or environmental threats; and
- requiring a good-faith effort to comply with the law.

Congressional Review

An agency is required, before a major rulemaking[1] can become effective, to submit to the House, Senate, and comptroller general a report containing the following information:

- a copy of the rule being promulgated;
- a concise general statement about the purpose of the rule, including whether it is a major rule; and,
- the proposed effective date of the regulation.

In addition, the agency is required to include with its report to the comptroller general the following information:

- a copy of the cost-benefit analysis of the rule, if any;
- the agency's actions relevant to sections 603, 604, 605, 607, and 609 of the RFA; and,
- the agency's actions relevant to sections 202, 203, 204, and 205 of the Unfunded Mandates Reform Act of 1995.[2]

Major rules cannot take effect until the end of a 60-legislative-day period that begins on the latter of one of the following dates: (1) when Congress receives the agency's report or (2) when the rule is published in the *Federal Register*. Congress may rescind any such rule by a joint resolution of disapproval within the time designated above, subject to a Presidential veto.

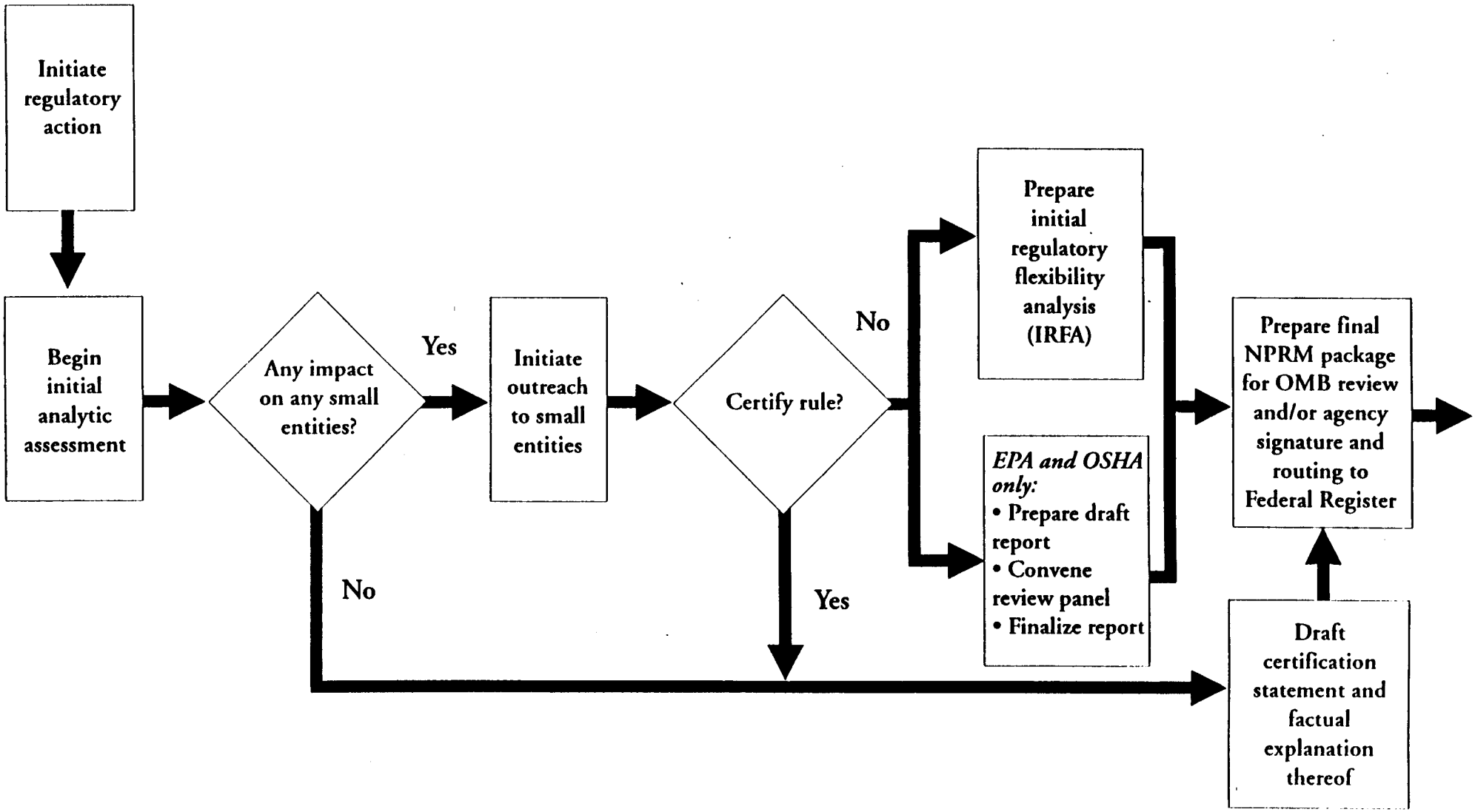
[1] According to the SBREFA, "major rule" is defined as a rule with an impact on the economy of $100 million or more, or a major impact on an industry, government or consumers, or those affecting competition, productivity, or international trade.

[2] 2 U.S.C. § 1501.

Appendix E: Overview of the RFA Analysis Development Process

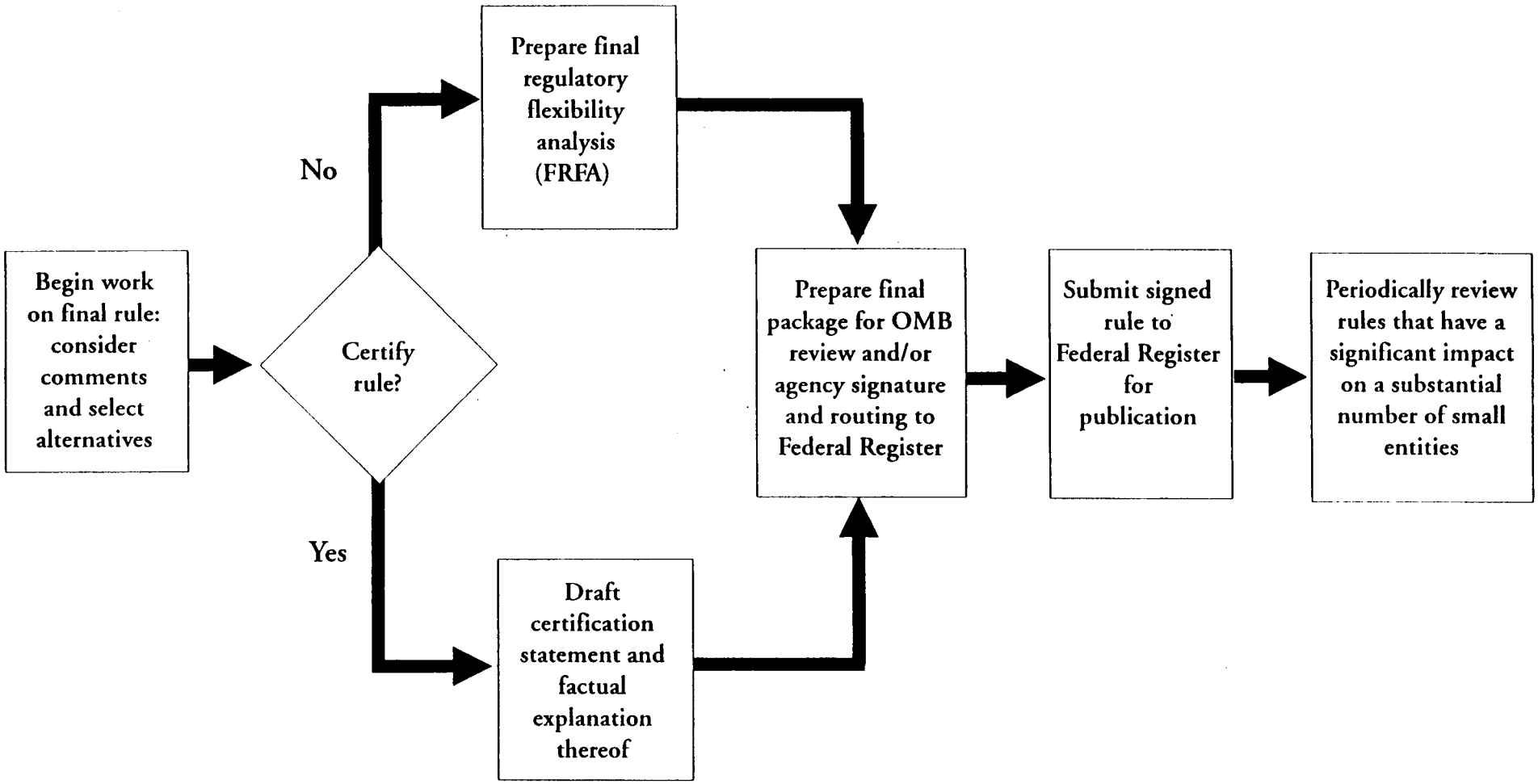
The charts on the following two pages offer a schematic view of the process established by the Regulatory Flexibility Act for analyzing the impact of federal regulations on small entities.

Overview of the RFA Analysis Development Process, Part I



U.S. Small Business Administration, Office of Advocacy.

Overview of the RFA Analysis Development Process, Part II



Note: Under the Small Business Regulatory Enforcement Fairness Act of 1996, additional steps may be required (such as preparation of compliance guides and Congressional review). This diagram only illustrates steps required under the Regulatory Flexibility Act as amended.

U.S. Small Business Administration, Office of Advocacy.

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Memorandum

To Angus Crane, NAIMA

From\Location Michelle Burke, WNTS

Date June 23, 1998

Re **Accounting/Tax Treatment of Testing Costs**

North American Insulation Manufacturers Association ("NAIMA") has asked PW to comment on the appropriate accounting and tax treatment of costs incurred under the Toxic Substances Control Act (TSCA) for proposed testing of carbonyl sulfide ("COS"). The EPA seems to suggest treating the cost of testing COS as a capital investment and amortizing the cost over a period of fifteen years.

The EPA has estimated that the overall costs of the TSCA's Amended Proposed Test Rule for Hazardous Air Pollutants (HAPs) will be an insignificant cost per company relative to revenues. One of the reasons the EPA estimates the cost to be insignificant is because the EPA is spreading the costs over an extended time period. The EPA's HAPs testing does not elaborate on the EPA's selection of an accounting method to capitalize and amortize the costs over a fifteen year period. Therefore, NAIMA has requested that PW comment on the appropriate accounting and tax treatment regarding costs incurred for these environmental studies.

Chemical Manufacturers Association (CMA), a tax-exempt trade association, will collect a special assessment from the various manufacturers who are required to participate in the EPA's HAPs testing. CMA will then contract with an independent lab to perform the testing on behalf of the various manufacturers. The question addressed in this memorandum is: should the various manufacturers deduct the expense when paid, or capitalize the expense and amortize the cost over a period of time.

Conclusion

Since the HAPs testing is not creating an asset, extending the life of an existing asset, or preparing an asset for sale, the appropriate accounting treatment to the various manufacturers would be to expense the testing costs as incurred. Given this accounting treatment plus the fact that the HAPs testing is not producing a long-term benefit for the various manufacturers, the costs are not chargeable to a capital account under IRC §263(a), but instead are deductible as an ordinary and necessary business expense under IRC §162.

Accounting Treatment

FASB Emerging Issues Task Force provides the following guidance with regards to the appropriate accounting method:

> EITF 90-8 - "Capitalization of Costs to Treat Environmental Contamination"- In general, environmental contamination treatment costs should be charged to expense with

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certain limited exceptions. Capitalization is subject to a recoverability test, only if at least one of the following criteria is met:

1) The costs extend the life, increase the capacity or improve the safety or efficiency of property owned by the company, and the condition of the property is improved as compared with the condition of the property when originally constructed. (For example: asbestos removal).

2) The costs mitigate or prevent environmental contamination that has yet to occur and that otherwise may result from future operations or activities, and the property is improved as compared with its condition when constructed. (For example: air pollution control equipment).

3) The costs are incurred in preparing for sale property that is currently held for sale, subject to a recoverability test.

Environmental contamination costs are costs a company incurs to remove, contain, neutralize, or prevent existing or future environmental contamination. These costs may be incurred voluntarily or as required by law. They include a wide range of expenditures, including cost of environmental studies.

Under the TSCA, the EPA's stated purpose is to test HAPs for certain health effects. In other words, the COS testing is not emissions testing but toxicology testing. It is our understanding that the testing is not linked to assuring that existing equipment is meeting pollution standards or to designing any specific pollution equipment.

Since the testing is not creating an asset, extending the life of an existing asset, or preparing an asset for sale, EITF 90-8 suggests the appropriate accounting treatment would be to expense the testing costs as incurred.

Tax Treatment

Typically tax treatment follows book treatment unless other specific guidance is provided. There is very little guidance on the appropriate tax treatment of costs incurred for environmental studies.

Generally, IRC §162 allows as a deduction all the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business. While, IRC §263 provides that no deduction is allowed for any amount paid out for new buildings or for permanent improvements or betterments made to increase the value of any property. IRC §263 serves as a general means of distinguishing capital expenditures from current expenses. Additionally, IRC §263(a)(2) provides that no deduction shall be allowed for any amount expended in restoring property or in making good the exhaustion thereof for which an allowance has been made in the form of a deduction for depreciation, amortization, or depletion.

Reg. §1.263(a)-1(b) provides that capital expenditures include amounts paid or incurred (1) to add to the value, or substantially prolong the useful life, of property owned by the taxpayer, such as plant or equipment, or (2) to adapt property to a new or different use. Reg. §1.263(a)-

2(a) provides that capital expenditures include the costs to acquire, construct, or erect buildings, machinery and equipment, furniture and fixtures, and similar property having a useful life extending substantially beyond the taxable year.

Indopco, Inc. v. Commissioner, 503 U.S. 79 (1992), stated that although the mere presence of an incidental future benefit--"*some* future aspect"--may not warrant capitalization, a taxpayer's realization of benefits beyond the year in which the expenditure is incurred is undeniably important in determining whether the appropriate tax treatment is immediate deduction or capitalization. The fees CMA will collect will be used to perform HAPs testing. The stated purpose of the testing is to ascertain certain health effects of the HAPs on the environment. The testing will not be performed to provide a solution to lower HAPs emissions or to design specific pollution control equipment. Since, the various manufacturers will not be realizing any future benefit from the testing, *Indopco* would suggest that a current deduction would be the appropriate tax treatment.

In Revenue Ruling 94-38, 1994-1 C.B. 35, the Service allowed a deduction for costs incurred (within the meaning of the economic performance rules of IRC §461(h)) to clean up land and to treat groundwater that a taxpayer contaminated with hazardous waste from its business (other than costs attributable to the construction of groundwater treatment facilities, which were determined to be capital expenditures under IRC §263). In this ruling, the taxpayer acquired the land in a clean state, polluted it with waste from its manufacturing operations, and then stored the waste on its land. The cleanup involved the removal of the contaminated soil and its replacement with clean soil and the installation of pumping and filtration equipment to clean the groundwater contaminated by seepage of the waste. The Service ruled that the remediation and ongoing groundwater treatment expenditures did not result in improvements that increased the value of the property because the taxpayer "merely restored its soil and groundwater to their approximate condition before they were contaminated by [the taxpayer's] manufacturing operations."

TAM 9627002 allowed a deduction for environmental study costs and legal and consulting fees. The Taxpayer argued that the costs were environmental remediation expenditures deductible as ordinary and necessary expenses of carrying on a trade or business pursuant to Revenue Ruling 94-38. According to the Taxpayer, the costs were environmental remediation costs that, like the costs at issue in the revenue ruling, did not result in improvements that increased or improved the condition or value of the property vis a vis its condition at the time of the Taxpayer's original acquisition of the property.

The Service has held that the costs of environmental impact studies are deductible under IRC §162 unless chargeable to a capital account. Rev. Rul. 80-245, 1980-2 C.B. 72, stated that costs incurred by public utility for environmental impact studies to support an application to state regulators for expansion are not deductible as research and development under IRC §174 but are deductible under IRC §162 unless chargeable to a capital account. The studies conducted by the utility company were several types of environmental impact studies for site selection, such as: to ascertain the socio-economic impact of the plant on the surrounding community, to ascertain the impact of the facility on the terrestrial ecology of the proposed site, and etc.
PLR 8211004 allowed a taxpayer to deduct the cost of testing and developing a potential drug from time of receipt of an Investigational New Drug to the filing of an New Drug Application as research and development expenditures under IRC §174. This letter ruling stated that the costs in this instance differed from those costs in Rev. Rule 80-245, which were incurred to convince

a regulatory agency that certain plant expansions would not adversely affect the environment. Those cost were not expended to develop a concept of a model or process; as were the cost in the letter ruling. The costs in the letter ruling were of an experimental nature; as opposed to those in Rev. Rule 80-245. The HAPs testing costs are not incidental to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property. Therefore, the testing costs, in accordance with Rev. Rule 80-245, do not qualify as research and development expenditures but would instead qualify as an ordinary and necessary business expense.